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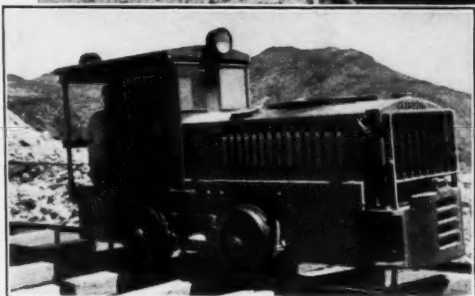
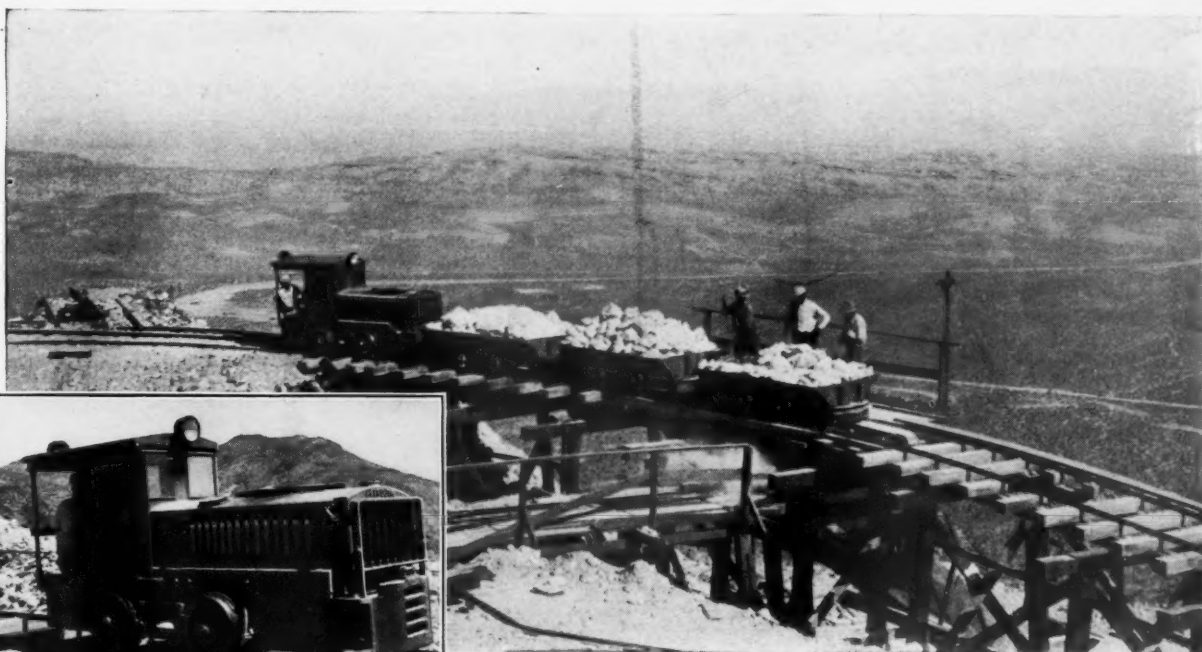
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BLUE DIAMOND COMPANY LOS ANGELES

October 1, 1925.

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Plymouth, Ohio.
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Plymouth Locomotive Works
PLYMOUTH, OHIO

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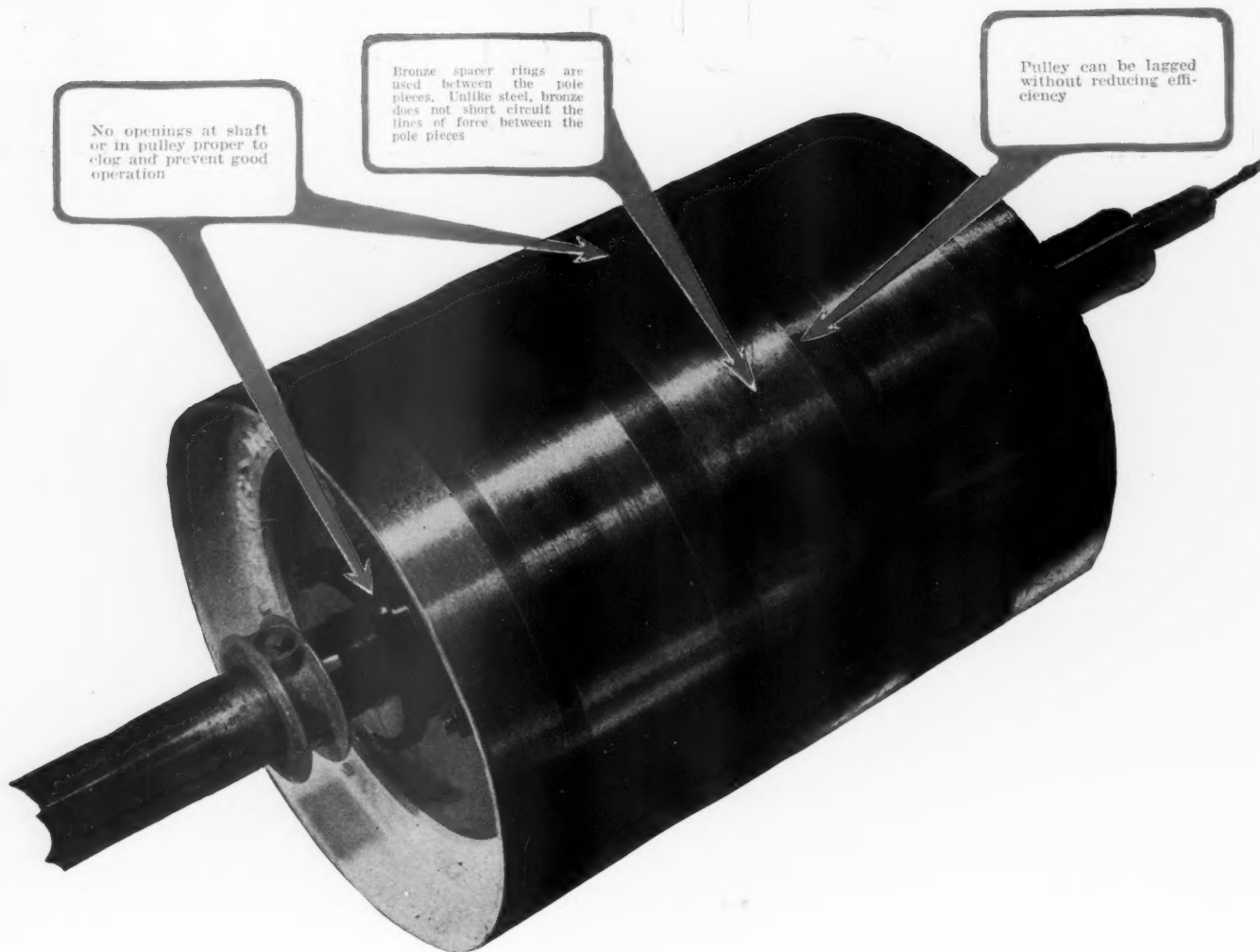
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The Manufacture of Lime in Florida

The Softness of the Rock Introduces Unusual Problems

By J. R. Thoenen,
Mining Engineer, Greenville, Ohio

AT the present time there are only three plants manufacturing commercial lime in Florida. These are all located in and around the city of Ocala and all utilize the soft Ocala limestone for burning. The original or plant No. 1 of the Florida Lime Co. was opened at Ocala in 1884 and kilns were erected in 1892 by the original company, which was known as the Ocala Lime Co. The Florida Lime Co. was organized in 1907 and operated three plants with a daily capacity of 500 bbl. More recently the Commercial Lime Co. erected a battery of 10 kilns at Reddick, about 10 miles north of Ocala, and this company within the last few months has acquired the Zuber plant of the

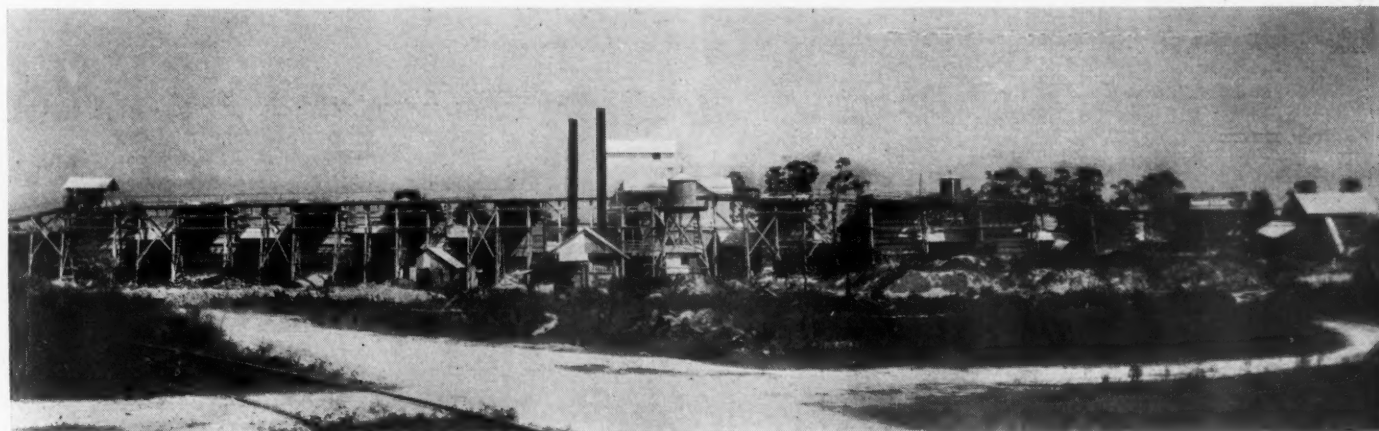
ments have been imported from Alabama and Georgia. There are various reasons given for this apparent neglect of lime production. The suddenly increased demand for road stone and the smaller capital outlay and technical knowledge required for its production, in comparison with the manufacture of lime, and the dumping of surplus lime at competitive prices from adjoining states, are probably the main causes.

There are at the present time 16 kilns in operation. These are all of the vertical, continuous, separate feed type, of brick construction, with open hopper at the top and fired with wood through arched fireboxes at the bottom. The soft nature of the Ocala

to clog the draft of the hot gases. Capacities of kilns are given as from 50 to 60 bbl. daily with fuel ratios from 15 to 20 bbl. of lime to one cord of wood.

Florida Lime Co.

The Florida Lime Co.'s pit No. 1, just outside of the city of Ocala, was the first pit to be opened in the state for the production of burned lime and is still being worked for that purpose. The Ocala limestone is quarried to a depth of about 30 ft. and it underlies from two to five feet of argillaceous sand. This overburden is removed by hand. The rock is drilled by hand with jumper drills and blasted with



Reddick plant of Commercial Lime Co.

Florida Lime Co. and operates it under the name of the Dixie Lime Products Co.

Previous to about 1915 Florida produced sufficient lime for all domestic requirements, but since that time, and particularly during the recent phenomenal growth of the state, from one-half to two-thirds of the require-

limestone complicates the problem of the lime burner and increases the difficulty of burning. For this reason the heights of the kilns above the furnaces are kept low, the height varying from 14 to 20 ft. In higher kilns the soft stone has a tendency to crush with the increased weight of the column and

low strength dynamite. Broken stone is loaded by hand to small steel side dump, rocker type cars and hoisted by a friction drum hoist to a turntable at the top of the quarry. Here the cars are turned by hand and are again hoisted with the same hoist to the top of the kilns. The stone is

then dumped over bar grizzlies, the oversize or kiln rock going to the kiln hopper, the undersize falling through the grizzlies to the ground to be loaded into wagons or trucks for road material.

Burned lime is drawn through a door at the bottom of the kiln and forked. Lump material is barreled for shipment. The fines are sent to a Clyde hydrator and shaking screens for separation. The marketed prod-

ucts are commercial and agricultural lime.

It is rumored that this company contemplates the erection of a large modern plant in the near future.

Dixie Lime Products Co.

The Dixie Lime Products Co.'s plant is located at Zuber, about six miles north of Ocala, and was until recently owned and operated by the Florida Lime Co.

The location is here on somewhat higher ground and therefore it is possible to quarry to a depth of 55 to 60 ft. before the permanent water level is reached. The overburden consisting of 1 to 4 ft. of dark clay loam, is removed by an Erie caterpillar traction steam shovel fired with coal and using a $\frac{7}{8}$ -yd. dipper. The material is hauled away in trucks or wagons.

Formerly the quarry face was drilled with



Quarry and crushing plant of the Reddick, Fla., plant, Commercial Lime Co.



Left—Loading road stone at the Commercial Lime Co.'s plant at Reddick, Fla. Right—Conveying limestone from quarry to lime kilns at same plant



Left—Stripping shovel at work at Dixie Lime Products Co. quarry at Zuber, Fla. Right—A section of the same quarry; the quarry face is 60 ft. high

jumper or churn drills by hand but now a Loomis Clipper blast hole drill, No. 1½, traction mounted, is employed. Holes are drilled to the bottom of the quarry with a diameter of 4 in. The drill uses gasoline power.

Broken stone is loaded by hand with stone forks to 1-yd. side dump steel cars and hoisted directly to the tops of the three kilns by a steam hoist over an incline built on the side of the pit. The fine stone is loaded by hand and hoisted over another incline to bins or to surface storage to be

Raymond separator.

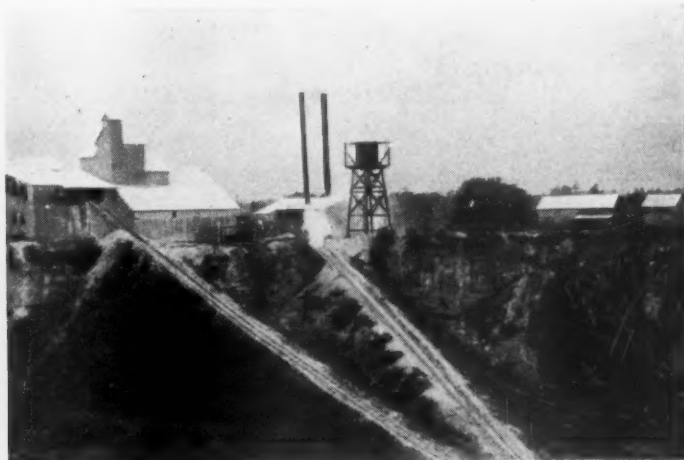
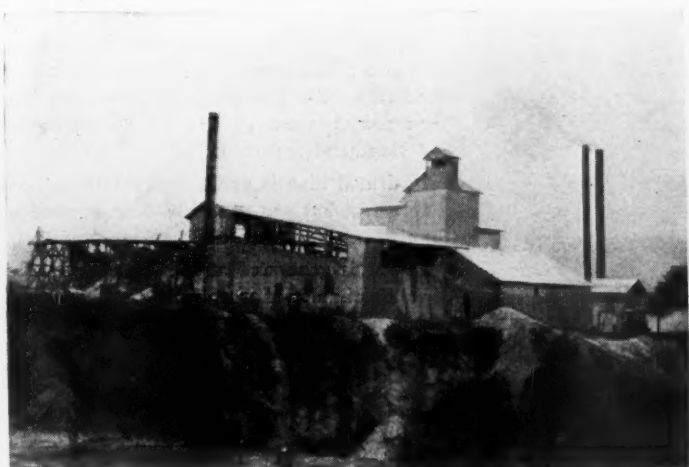
At the time of the writer's visit the rotary kiln was not in use as the operation of this unit had not proved altogether satisfactory, owing to the tendency of the burning lime to crumble and cause a mass of fine material. This tended to cover the larger pieces, resulting in their protection from the hot gases and consequent underburning or coring.

The company is erecting a large new road material plant in connection with its quarry operations. With this new plant in operation

rotary trommel directly below the crusher. The daily capacity of this plant will be 40 cars, or 2000 tons. Power at the Zuber plant is supplied by a 120-h.p. Fairbanks-Morse full diesel engine operating on Mexican oil.

Commercial Lime Co.

The plant of the Commercial Lime Co. at Reddick, Fla., about 12 miles north of Ocala, is the largest in the state and consists of 10 vertical kilns with a total daily capacity of 500 bbl. This plant is of comparatively



Left—Dixie Lime Products Co. lime plant at Zuber, Fla. Right—Inclines from quarry to kilns of Dixie Lime Products Co. plant at Zuber, Fla.



Quarry and lime plant of the Florida Lime Co. at Ocala, Fla. The quarry was the first to be opened in Florida for production of lime

sold as road material, or held for burning in a rotary kiln.

The vertical kilns are fired with wood fuel consisting of green oak and pine obtained from the locality immediately surrounding the plant. The stone which is fed to the kilns ranges in size from 2½ in. up to 10 in. All the kilns are of brick construction, 17 ft. above the furnaces, and of 5 ft. inside diameter. There is a cooling chamber below the furnace and burned lime is drawn off below this through arc-type gates to barrows or buggies on the drawing floor. The burned lime is separated by forking and lump material is barreled for shipment. The fine material is sent to a Clyde hydrator and

all quarry run material will be hoisted directly to the new plant where the coarse rock will be separated over a rotary screen and sent to the kilns. The fine material will then go to the crusher or directly to railway cars as required.

This plant, like other stone plants utilizing the Ocala limestone, is quite simple in operation owing to the softness of the stone and the minimum requirements for screening. The quarry run will be dumped to a McLanahan single-roll crusher from which the crusher material will fall directly to the cars below without the intervention of storage bins. Kiln rock will be removed either before crushing or by the insertion of a

recent construction, embodying many modern and efficient features.

The quarry is located about one-quarter mile from the kilns and is of the usual type found in the extraction of the Ocala limestone. The face, which is about 30 to 35 ft. in height here is drilled with jumper or hand churn drills, on contract, to a depth of 28 to 30 ft. and the holes finished with churn drills with chisel bits, fitted with ball valves using water in the hollow pipe handle or stem. The holes are loaded and shot with 20 to 30% dynamite.

Broken stone is loaded into side dump rocker type cars of 1-yd. capacity by two full-circle, caterpillar traction, Erie

steam shovels, fired with oil and fitted with $\frac{3}{4}$ -yd. dippers. Loaded cars are hoisted to the crushing plant by cable from friction drum hoists over inclines on the side of the pit, and dumped to a steel lined hopper over the crusher.

The crusher is of the usual McLanahan single lugged roll type with 30x12-in. opening. Crushed stone passes to a cylindrical trommel with 4-in. round perforations. The undersize from this screen falls directly to railways cars beneath for shipment as road material. The oversize from the end of the screen falls to a bin to be used for kiln stone.

The kiln stone is drawn from this bin into auto trucks and conveyed to the foot of an incline over the kilns. The trucks dump through a small opening to a hopper type side dump car in a pit excavated beneath the ground level at the lower end of the kiln incline. These cars are then hoisted to the tops of the kilns and the stone dumped in them as it is required. The kilns are built in line so that the car can dump into any one without switching.

The kilns, 10 in number, are of brick construction 18x18 ft. outside and 20 ft. high



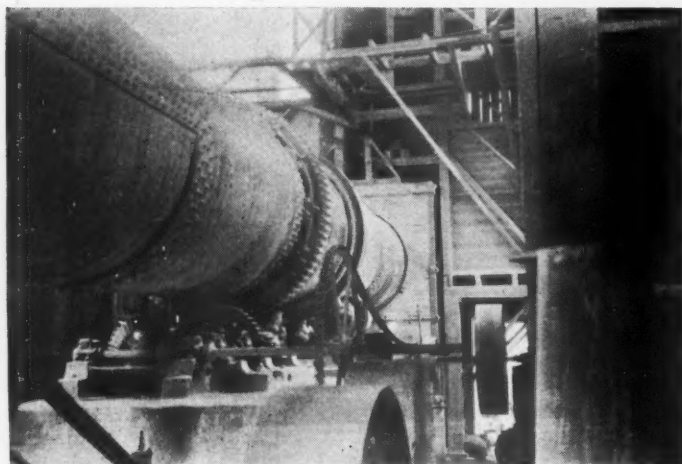
Dumping limestone into kilns at Florida Lime Co.'s plant, Ocala, Fla.

above the eyes. The inside of the kilns is tapered from $6\frac{1}{2}$ ft. diameter at the furnace to $5\frac{1}{2}$ ft. at the hopper. Wood is used for fuel and burned in two furnaces built on either side of each kiln.

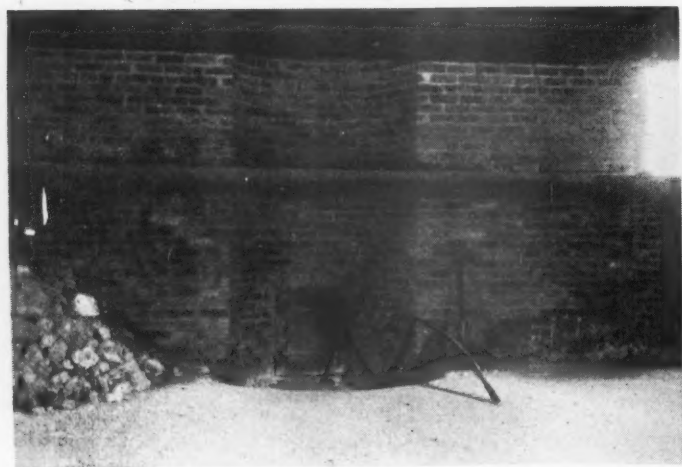
The burned lime is drawn through arc gates to barrows and sent to an 18x24-in. corrugated roll crusher. The crushed lime is elevated to a cylindrical trommel with $\frac{1}{2}$ -in. round holes. Oversize from this trommel goes to the coarse bin and is packed in $\frac{1}{2}$ -bbl. waterproof sacks or wooden barrels for shipment as lump lime. Undersize from the trommel is sent to the hydrate bin. Provision is made so that when a greater percentage of hydrate is required the oversize can be sent to a No. 3 hammer mill and from there elevated to the hydrate bin. From this bin the material is conveyed to a Clyde hydrator and Raymond separator.

Hydrated lime is made in a single unit at the present but provision has been made for the addition of other units as required.

Power is generated at the kilns by a 100-h.p. Fairbanks-Morse full diesel engine burning Mexican distillate and at the quarry with a 75-h.p. Fairbanks-Morse semi-diesel engine.



Left—Rotary kiln. Right—Drawing floor of Dixie Lime Products Co. plant at Zuber, Fla.



Left—Drawing floor, Florida Lime Co.'s plant at Ocala, Fla. Right—Bagging hydrate at Dixie Lime Products Co. plant at Zuber, Fla.



New roadstone plant under construction for Dixie Lime Products Co., at Zuber, Fla.

The company expects to develop the rotary kiln later on to utilize some of the fine stone now being sold as road material. With the present great demand for fine stone, and the suitability of the Ocala limestone for the type of roads now being constructed in the vicinity, the problem of disposal of this material presents little difficulty. This is a matter worthy of note when compared with the large waste of similar material from the northern lime plants.

Owing to the favorable climate the quarrying and manufacture of lime can be carried on during the whole year and in spite of the importation of lime from adjoining states the demand for Florida burned lime is brisk at all times, or so the writer is informed. The product is a high calcium lime with very little magnesium. The original analysis of the Ocala limestone ranges from 96 to 98.5% calcium carbonate and from zero to a trace of magnesium carbonate.

Diatomaceous Earth*

By C. W. Davis

Assistant Chemist, Rare and Precious Metal Experiment Station (Reno, Nev.),
Bureau of Mines, Department of Commerce

DIATOMACEOUS earth consists almost entirely of the silicious remains of minute flowerless aquatic plants known as diatoms. The name diatomaceous earth, therefore, is to be preferred to others such as trade names, inappropriate terms, or names correctly applied to some other product. The following names should, therefore, not be used for diatomaceous earth,—kieselguhr, infusorial earth, diatomite, celite, moler, bergmehl, English rottenstone, tripoli, tripolite, fossil earth, desmid earth, white peat, tellurine, randanite, ceyssatite, or any trade name.

Formation

Diatoms live in practically all kinds of water, fresh or salt, hot or cold, still or running and under different conditions of depth and pressure. These minute plants assimilate inorganic salts from their environment and produce skeletons of silica much as mollusks secrete lime and form their shells. When the diatoms die they settle to the bottom together with anything else which may be present, such as sand, clay or volcanic ash. The organic matter gradually disappears leaving the silicious skeletons of the diatoms which, with impurities, make up the deposits of diatomaceous earth. These

deposits which are still being formed at the present time and which were produced throughout very different epochs, were more prolifically formed in the Tertiary, so that the thickest beds so far discovered are of that Age.

Composition

The principal constituent of diatomaceous earth is amorphous, or opaline silica which if uncontaminated should contain about 94% silica (SiO_2) and 6% combined water (H_2O), when thoroughly air dried. Commercial material contains more or less foreign material, such that its composition varies within the following limits.

	Parts	Per cent
SiO_2	65.0	95.0
$\text{Fe}_2\text{O}_3, \text{Al}_2\text{O}_3$	8.0	0.2
CaO, MgO	7.0	0.1
$\text{K}_2\text{O}, \text{Na}_2\text{O}$	5.0	0.0
$\text{H}_2\text{O}, \text{C}, \text{N}, \text{O}$, etc.	15.0	4.0
	100	99.3

Properties

Chemical Properties—Pure diatomaceous earth reacts as does ordinary opal. The air-dried material gives off water on ignition, is easily soluble in hydrofluoric acid and in all strengths of sodium carbonate solution. For some uses the chemical properties are not important except that impurities may increase the apparent density and cause the material to become colored either in the raw state or when heated. Other uses require

that the material be free from impurities that would affect fluxing, affect the solubility in different reagents, or introduce objectionable substances in any product.

Physical Properties—Diatomaceous earth, when pure, is usually white, but may be dark colored from the organic matter of diatoms that has not yet disappeared. Impurities may cause the material to have a variety of colors such as gray, brown, pink or green. Due to its method of formation diatomaceous earth is usually soft, very friable, and of low apparent density being filled with billions of microscopic air cells, but due to various conditions a single deposit may contain all gradations from this material to the hardest of compact flints. Among the important physical properties are: high absorbent power, to which decolorization, clarification, and detergent effect are due; extreme porosity with the resultant low apparent density and large surface, the porosity causing the material to be a superb filtering medium and the large surface affording a support for catalysts; innumerable minute enclosed air cells, which remain intact on reducing to a powder, and cause it to be a poor conductor of heat and sound; angular nature, weakness and low compressive strength which gives an abrasive effect without scratching.

To the producer of diatomaceous earth its most important industrial application is as a filtering and clarifying material. The consumption for this purpose is large, and although the material must be of good grade (fulfilling definite requirements) and requires special preparation, its price is relatively so high that it will stand shipping to distant points.

A second extensive use for this material is as an insulator. This field is at present being greatly enlarged, as the economy effected by its use is beginning to be more widely appreciated, due to educational advertising. Although crude material requiring little preparation may be used in many cases, its selling price is low so that it can not be profitably shipped.

Other uses for diatomaceous earth which are only of local importance or which consume relatively small amounts of material, may be classified as: building material, as a filler, as an abrasive, as an absorbent, as a chemical reagent, and for miscellaneous purposes.

Although there are large deposits of diatomaceous earth in various localities suitable for all the uses to which such material has been put, its profitable mining and marketing will probably be limited, for a long time, to getting out small amounts for local consumption and to shipping small amounts for miscellaneous uses. This condition is due to the occurrence of large deposits elsewhere of material perhaps more favorably situated with regard to markets than the diatomaceous earth of these districts and to the necessity of producers having to compete with producers who have highly specialized plants in operation.

*Abstract from Serial No. 2718, Bureau of Mines.

The Development of the Gyratory Crusher

Changes Brought About by the Needs of Industry with a Discussion of the Use of Crushers

By Hugo W. Weimer

Consulting Engineer, Milwaukee, Wis.

TO the operators of small gravel and stone crushing plants who do not have engineers to consult, or who may not be familiar with the gradual advance in the design and construction of gyratory crushers, a brief outline of the development of breakers or crushers and information regarding their use and application will no doubt be interesting. In this article we will deal only with the type of gyratory crusher which has the main shaft pivoted above the head and with the eccentric, which gives the motion, below the head. The movement of this type of gyratory crusher shaft and head may be illustrated by holding a pencil in an upright position, the top being held firmly, while the bottom is moved in a circle. This illustrates also why the gyratory is continuously crushing when in operation. The head approaches every point of the concaves and on the opposite side, where the head has receded, the material is being discharged. It is a common expression to refer to the close and open sides, the close being where the crushing is done and the open where the material drops through.

Gyratory crushers of this type are made by a number of manufacturers, but for the purpose of illustrating the development of this type of crusher, sectional views of the Gates and McCully crushers are used for the reason that these two were the original gyratory crushers, placed on the market many years ago, and it is possible to show

the advance in design step by step. Minor details of construction do not enter into this discussion, it being the intention to note only such radical changes in design that are of historical interest.

THIS is the first of a series of articles by Mr. Weimar on rock crushing machinery and its use and application. The others will be on the following subjects:

Other Types of Crushers Than Gyratories.

Screening and Other Equipment. Plant Design. First Article.

Plant Design. Second Article.

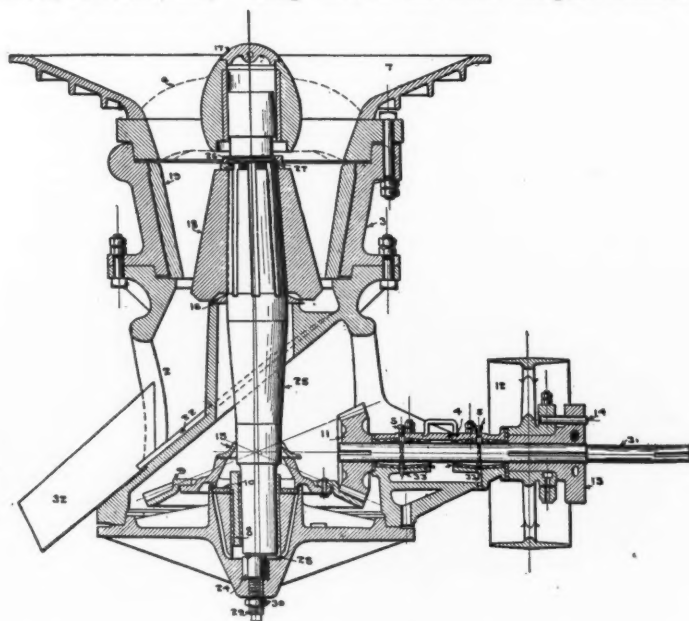
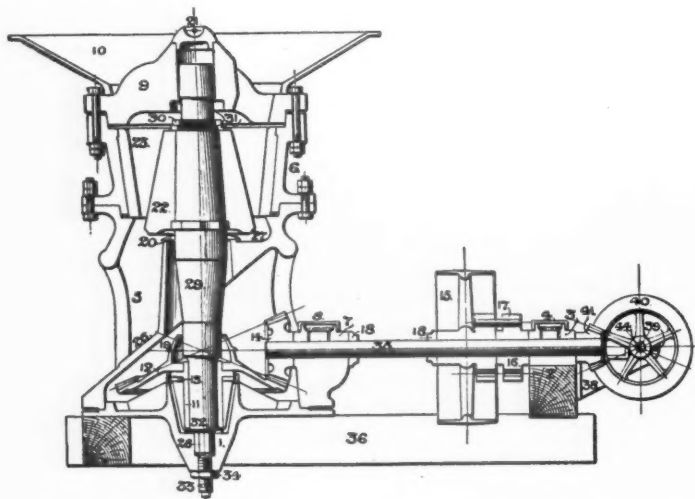
Mr. Weimar's long acquaintance with the rock crushing industry and the variety of his experience is a sufficient guarantee that these articles will be of the greatest value to those engaged in the production of crushed stone and gravel.—The Editors.

There are other types of gyratory crushers manufactured, but as the gyratory motion of these crushers is entirely different, they

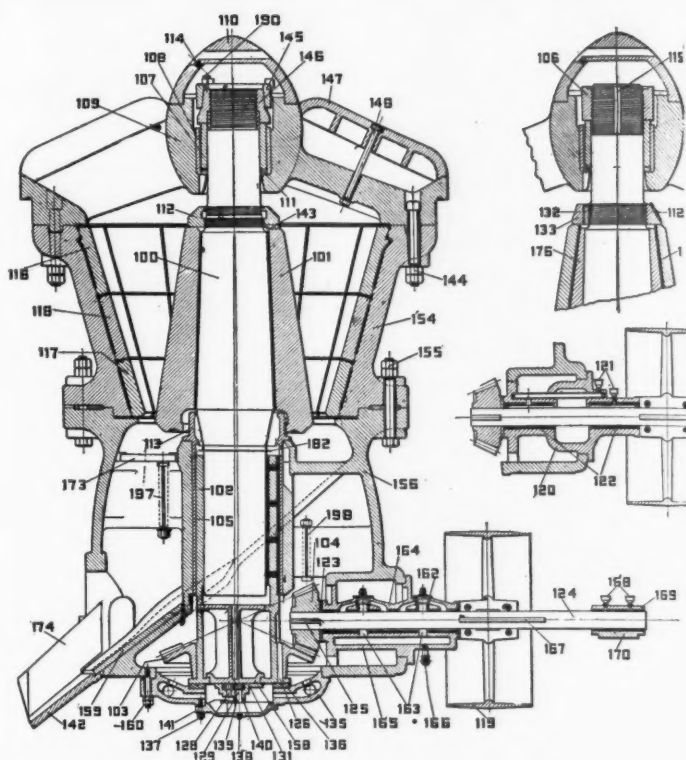
are not included in this article nor does the data given apply to them. One of these types has the shaft fulcrumed below the head with the eccentric which gives the motion above. In another design there is no fulcrum point, the eccentric being placed between the head and shaft. The first mentioned, with the eccentric at the top, gives a greater motion at the upper end of the head than at the lower end, the second with the eccentric between the head and shaft gives a parallel or equal motion the full length of the head, while the design as discussed in this article with the eccentric below the head has the greater motion at the bottom and the lesser at the top.

A Crusher of 50 Years Ago

One of the original gyratory crushers of fifty years ago is the Gates Style "B." Not having a drop bottom it was necessary to lift the entire frame clear from the bottom plate to get at the eccentric and bevel gear. The weight of the shaft and head is taken by a step button at the bottom and the adjustment for raising and lowering the head is made by means of the adjusting screw at the bottom of the shaft. Even though the design seems crude at this time, it had the true gyratory motion which is being used in the latest designed crushers



Left—One of the original gyratory crushers built 50 years ago. Note the obsolete flywheel and the outboard bearing on the pinion shaft. Right—The improved design which had a drop bottom so that the eccentric and gears were accessible and pinion shaft bearings fastened to the frame



The fully developed type of gyratory crusher. The main improvement over the design shown below was in placing the eccentric under the head, shortening and strengthening the shaft

today. Many of these crushers were equipped with fly wheel type pulleys supposedly to reduce the power consumption by taking care of the peak loads.

The First Forward Step

One of the first steps in the advancement of gyratory crusher design is illustrated in the above Gates Style "D" Crusher. The eccentric and bevel gear are more accessible because the bottom plate can be dropped.

The pinion shaft is supported by two bearings attached to the frame, making it possible to keep the gears in proper mesh more readily. The fly wheel type of pulley is eliminated, it being discovered at this stage that the minimum instead of the maximum centrifugal force exerted on the pinion shaft was most desirable. Stored up energy in the pinion shaft increased the hazard of breakage when tramp iron accidentally stalled the crusher.

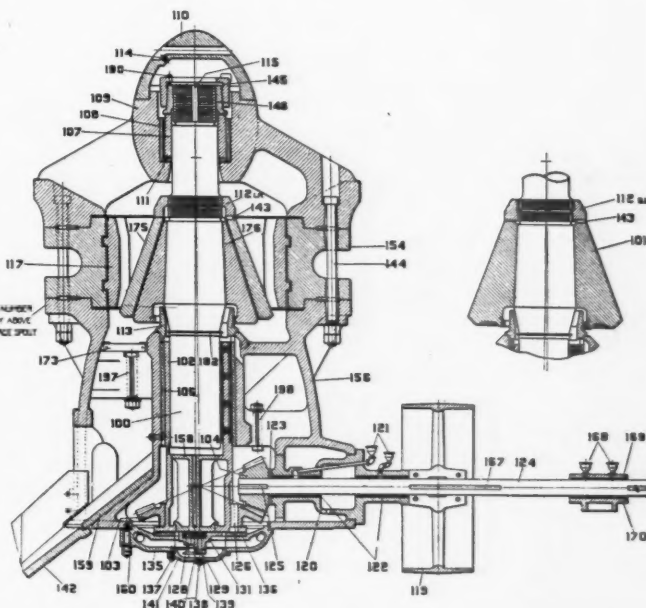
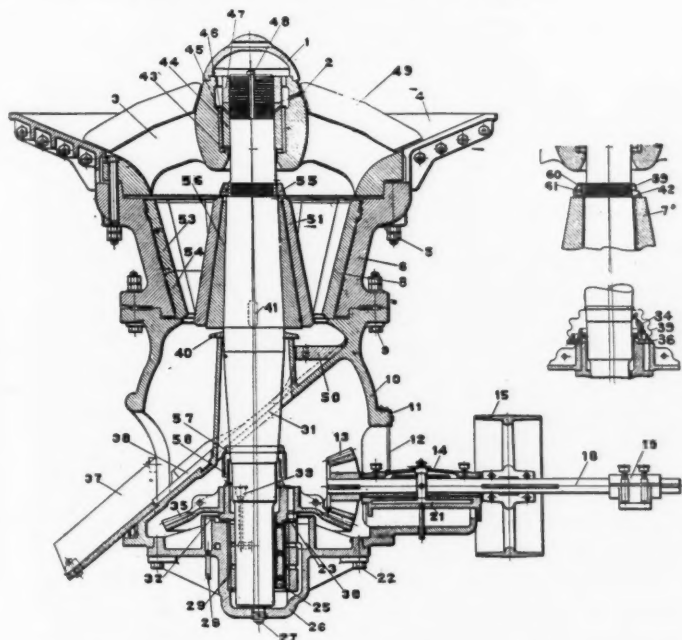
It was with this design that two-arm spiders were introduced to take the place of the three-arm type, thus giving more of an unobstructed feed opening.

The Standard Crusher Evolved 25 Years Ago

About twenty-five years ago quarry men had enough confidence in the performance of gyratory crushers and the result was a demand for larger sizes. Then the type as illustrated here by the standard McCully crusher was developed. The main shaft instead of being supported at the bottom is suspended from the top. This feature had previously been used with this make of crusher. Shaft suspension is an advantage on all sizes but more especially for the larger sizes. The shaft and head is raised or lowered as desired by means of an adjusting nut fitted to the threaded portion of the upper end of the shaft. At this time crushers were also designed and built to have a straight or side discharge spout as might be most suitable for each particular installation. Safety break pins fitted between the drive pulley and a fixed hub on the pinion shaft were also discarded at this time. Break pins never did function properly and with the new designs of crushers were unnecessary. The general design was improved in minor details resulting in a more efficient machine making it possible to produce the larger sizes of crushers.

A Gain in Efficiency

In recent years a still more efficient crusher was conceived as illustrated above by the "Superior" McCully crusher. The principal difference is the location of the eccentric which formerly was below the discharge diaphragm and which in this type is placed directly below the head. The strength



Left—The standard type of crusher developed 25 years ago. Note that the shaft is suspended from the top instead of supported from the bottom. Other details show improvement. This was the forerunner of the highly developed type shown above. Right—A fine reduction crusher of modern type; note that the head is wider and that the face of the concaves is vertical

of the shaft was naturally increased and shaft deflection was considerably reduced thus increasing crushing capacity. Almost equally important was the change from gears with rough cast teeth to bevel gears with machine cut teeth and the application of a force feed oil pump to furnish a steady flow of lubricant to the eccentric and bevel gears. All these refinements made it pos-

another by a "number" which is equivalent to the number of inches in dimension "B." Thus it is an easy matter for the operator to become confused. This condition is regrettable but cannot be changed at this late date, so it behooves the quarry man to understand thoroughly what determines the size of a gyratory crusher.

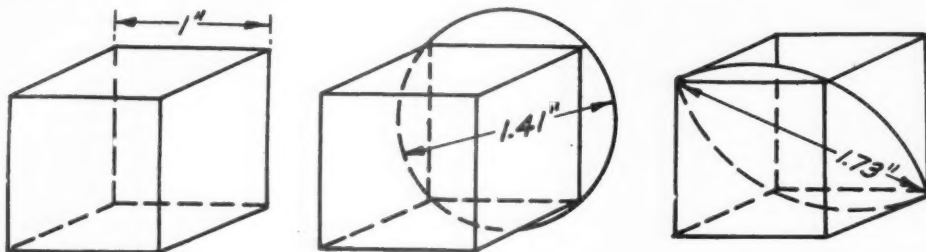
By referring to any gyratory crusher cata-

logue it will be seen that in addition to the "number" there is specified the "size of each feed opening." Thus a No. 5 crusher has listed in one catalogue two feed openings each 10x40 in. The 10-in. size is the dimension "B" which is the width of feed opening at the upper end of concaves and head, from point of concaves to point of head. The 40-in. dimension which is shown by let-

Relation of Feed Opening Size to Product Size

Conscientious manufacturers have tried their best to impress upon quarrymen that each size of crusher has its limitation for producing the various sizes of product and any attempt to exceed these would result in serious damage to the machine. There is a very good reason for this. The head has a certain amount of motion, or throw, from side to side shown by dimension "E," the distance of which is regulated by the eccentric. This motion has a direct relation to the smallest size of product that can be made by a standard size of crusher. By referring to the cut you will note that the open side is illustrated as being filled with the material to be crushed while the close side shows the material as crushed but before being discharged.

It will be noted that the amount of voids or spaces between the pieces of stone are less on the close side than on the open side. Therefore if the amount of motion were increased to the extreme that there would not be enough voids to take care of the stone being crushed the head would be bearing up



This illustrates what is meant by cube, ring, and screen size of product

sible to increase the number of gyrations resulting in increased capacity.

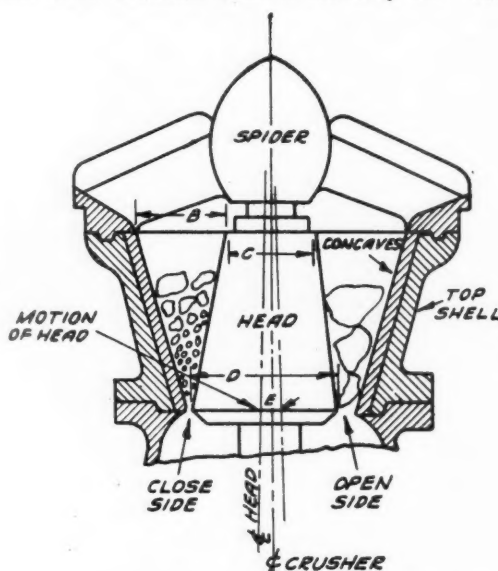
A Crusher for Finer Sizes Wanted

A few years ago when material specifications demanded more finely crushed stone and gravel it was up to the machinery manufacturers to furnish equipment that would give results economically, which meant that small sizes of crushers with larger capacities were required. A number of such crushers were designed and built, one of them being the "Superior" McCully fine reduction crusher illustrated here. The principal difference in construction between this design and the regular crusher of the same make is that the head is made larger in diameter and the concaves are placed vertically. Also the motion of the head is made to conform with the small size of product being produced and the number of gyrations increased. These changes made it possible to obtain a very large capacity of finely crushed material from a comparatively small size of gyratory crusher.

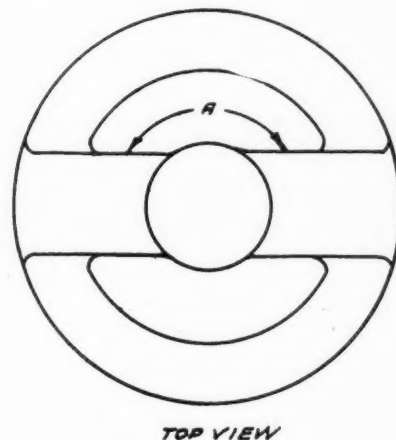
Sizes of Crushers

The original method of designating the various sizes of crushers was by a "number" which had a certain relation to the size of the feed opening "B" (This reference is to the accompanying sketch of a crusher head). About fifteen years ago one manufacturer when marketing a new type of gyratory crusher started the method of referring to the sizes of crushers by certain "inch" size which is equal to the dimension "B" in inches.

Up to the time when the largest crusher manufactured was a No. 10, there was but a slight difference in the relation of the "number" to the opening "B" in the various makes of crushers. When larger sizes were built, the various manufacturers used their own initiative and the result was that one designated the size by a "number" which is equal to one-half of the dimension "B" in inches, another by an "inch" size which is equal to dimension "B" in inches, and still



Sketch of crusher head showing close and open sides and the dimensions by which the crusher is rated



ter "A," is more or less an imaginary size. Too much attention must not be given the 40-in. dimension. The weight of a crusher, the overall height, or the width are no criteria by which to determine the size. The designs of various manufactures are such that a crusher of a certain weight and overall dimensions may be equal so far as crushing is concerned to a heavier and larger machine.

Three vital dimensions determine the actual size of a gyratory crusher, and they are the feed opening "B," diameter of head at the top "C," and the diameter of head at bottom "D." At this time gyratory crushers are built with feed openings varying from

2½ to 60 in. so that quarrymen have quite a range of sizes to choose from.

against a solid mass. This is exactly what occurs when setting a crusher closer than recommended by the manufacturer. If it is necessary to make a smaller product with a large crusher, then obtain a special throw eccentric that will give the proper motion to the head for the product desired. For small and medium sizes of crushers the close side is approximately 40% less than the open side, thus if a crusher has a 2-in. opening on the open side, the motion would be about .8-in. and the close side about 1.2-in. To operate a crusher with too close a setting is far more serious than having an occasional piece of tramp iron get into the machine, because the various parts are strained at every gyration

and eventually some part will break such as the main shaft, frame or spider.

The size of the largest product for a given size of crusher is limited by the minimum thickness of concaves and smallest diameter of head permissible. In order to give the various openings for each size of crusher the manufacturers make concaves of varying thicknesses and heads of different diameters.

Relation of Discharge Opening to Ring Size of Product

The three figures illustrated demonstrate what is meant by cube, ring and screen sizes. The cube size is self explanatory. By ring size is meant the diameter of the smallest round hole through which a piece of stone can be passed by hand. Screen size is the diameter of a round hole which is equal to the greatest cross dimension of a piece of stone. Thus a 1.73-in. round hole in a rotary screen will produce 1.41-in. ring size and 1-in. cube size product. Ring size is the usual dimension referred to when speaking of various sizes of crushed stone.

It is a common practice to assume that when a crusher is specified to make a certain ring size of product that it is meant that 85% of the discharged material will pass through the given ring size. Now the question is, what shall the opening on the open side be in order to give the desired ring size of product. It has been proven that no fixed rule will apply equally as well to all sizes. The most positive method would be to make a screen analysis of a test run of your particular material, but as this cannot always be done some theoretical method must be used. Up to a 1-in. ring size it is quite safe to have the opening on the open side the same as the ring size of the product desired. For a 2-in. ring size product the opening should be about 80% of the ring size desired or 1.6-in. and for 3-in. ring size about 70% or 2.1-in. Intermediate sizes would be in proportion to these figures. For ring sizes larger than 3-in. the open side should also be about 70%, or slightly less, of the ring size required. For the larger openings the open side is approximately equivalent to the cube size of the ring size product.

These figures are based on crushers fitted with smooth head and concaves. When a ribbed or corrugated head is used with smooth concaves, use the figure as arrived at for smooth fittings and deduct about one-half of the depth of the corrugation.

Capacity

It is customary to give the capacity of crushers as a number of tons per hour, and the listed ratings in catalogues are based on material weighing one hundred pounds per cubic foot which is an average weight for crushed stone. The main features that govern the capacities of gyratory crushers are the amount of motion or throw of head at the lower point of concaves, the diameter of head at this point and the number of gyrations per minute.

It is quite evident, although many times not taken into consideration, that the motion of the head is a very important factor, because the more movement (up to a certain safety point) the more actual crushing is done and consequently more material will be discharged at each gyration of head. The diameter of head naturally determines the area of the discharge opening, the larger the head, the more discharge area. The number of gyrations per minute, of course, is

than 3-in. size because more actual work must be done to accomplish the desired results. A certain amount of power is used to run a crusher even with no load and beyond that it all depends on what is being done. A 10-in. crusher for instance requires about 11 h.p. to operate when idling while the listed horsepower is from 20 to 35.

The ordinary driving arrangement is to belt from a line shaft or direct from a motor to the crusher pulley. The speed of

GYRATORY CRUSHERS—TABLE OF SIZES, DIMENSIONS, CAPACITY AND HORSEPOWER REQUIRED

(Figures are an average taken from various publications.)

Size of crusher Number	Inch	Each feed opening size in inches	In tons of 2000 lb. per hour ring size product	Capacity Tons	Horsepower required
1	2½	2½x 10	¾	1	2-3
2	5	5x 20	¾	8	4-6
3	6	6x 25	1	12	6-10
4	7	7x 28	1¼	20	10-15
5	8	8x 34	1½	40	15-25
6	10	10x 40	2	60	20-40
7½	12	12x 44	2½	100	30-60
8	15	15x 52	3¼	160	45-90
9	18	18x 68	3¾	220	60-100
10	21	21x 80	4¼	270	75-125
	24	24x 84	5	350	115-175
	30	30x100	5	475	125-200
	36	36x130	7	1000	150-250
	42	42x140	7	1100	200-275
	48	48x160	8	1200	225-325
	60	60x200	8	1500	250-400

equally as important. Everything else being equal, a crusher at one hundred gyrations per minute will have about twice the capacity of a crusher at fifty gyrations.

For many installations, when the size of the primary crusher is decided upon more for the large feed opening than capacity, it is advisable to reduce either the speed or the motion of the head so that the capacity will more nearly balance with the secondary crushers and other following equipment. By making either one of these changes the crushing capacity is reduced and also the power consumption.

Since it has been explained that the throw or motion of the head is a very important factor, then it naturally follows that any lost motion due to excessive wear on the eccentric or spider bearing, or any shaft bending or deflection, will proportionally reduce the capacity. It is up to the quarryman to carefully check the wear on the eccentric and spider bearing if the maximum production is desired. As far as shaft deflection is concerned that rests entirely with the design and construction of the crusher itself. The greater the distance between the head and eccentric, the more the deflection and consequently the more loss of capacity.

Power Requirements

The horsepower required to drive gyratory crushers is listed in catalogs and gives a range from the lowest to the highest power needed. It is quite proper to list power requirements in that manner because the hardness of the material and the ratio of reduction or work accomplished are the determining factors. It is reasonable to assume that more horsepower will be required to crush trap rock, granite or hard gravel than ordinary limestone. Also if feeding an average size of 6-in. material to a crusher more power will be necessary to crush it to 2-in.

the crusher pulleys is such that a fairly high speed motor can be used when belting direct from a motor pulley to crusher pulley. In recent years it has been demonstrated by actual practice that there is no objection to coupling a motor direct to crusher drive shaft thus eliminating all belting. The best method for doing this is to have a rigid coupling close against the crusher bearing then a short piece of shaft with a flexible coupling at the other end which is attached to the motor. The flexible coupling takes care of the motor alignment and with the short piece of shaft, which can be easily removed, it is possible to take out the pinion and shaft without disturbing the motor setting.

Erecting and Operating

Crushers cannot operate to best advantage when bearings are full of dirt or parts are not properly lined up. When crushing wet material take the precaution to keep the dirt from building up under the head and getting into the eccentric bearing. It is just as necessary to keep the spider bearing clean and well lubricated. The bevel gears should mesh properly and all joint bolts must be kept tight. When buying a new crusher and specifying a certain size of opening, the machine will usually be set to give the required opening with the head in its lowest position. There is a certain amount of adjustment so that the head can be raised from time to time to take care of the wear on the head and concaves thus keeping the same opening. Crushing plants are at their best dirty and dusty places, and as crushers are an important and expensive item in plants, they should have regular attention. Most manufacturers publish bulletins giving instructions for erecting, operating and repairing the crushers they make. Users of crushers should procure these and keep them for reference.

Washing Barytes in the Georgia Field

Methods That Will Interest Sand and Gravel Operators Because of the Clean Product Made

BARYTES is a mineral that has been mined and sold for a good many years, but it was only about fifteen or twenty years ago that it became of much commercial importance. It was formerly used either as an adulterant or a substitute, principally because it was cheap and heavy. It adulterated white lead or was substituted for it in places where a cheap heavy white pigment was wanted.

Afterwards it was found that barytes had certain valuable qualities of its own, and the demand for it increased. During the war the demand was especially strong, owing to the lessened importation. Now it is produced in Georgia, Tennessee, Missouri and to a small extent in some other states and a tariff keeps imported barytes from crowding the product out of the home market.

Barytes may be reckoned as one of the minor rock products industries, as the total tonnage produced is small. But in its preparation for the market there are valuable hints for those who wash sand and gravel and crushed stone, especially when these materials contain clay balls and such deleterious minerals as shale and lignite. In fact the same washing methods and machinery that are used in barytes washing are beginning to come into use in washing other rock products.

Barytes is rarely found in large enough deposits to be worked by the modern methods of blasting down and loading with steam shovels. It is so worked in the Georgia field as the pictures show. But a great part of the barytes is recovered by "gophering,"

that is digging out a little pocket here and there. There are parts of Missouri where one remembers seeing a heap of a few tons of lump barytes at every station, and all of it was dug in this simple way.

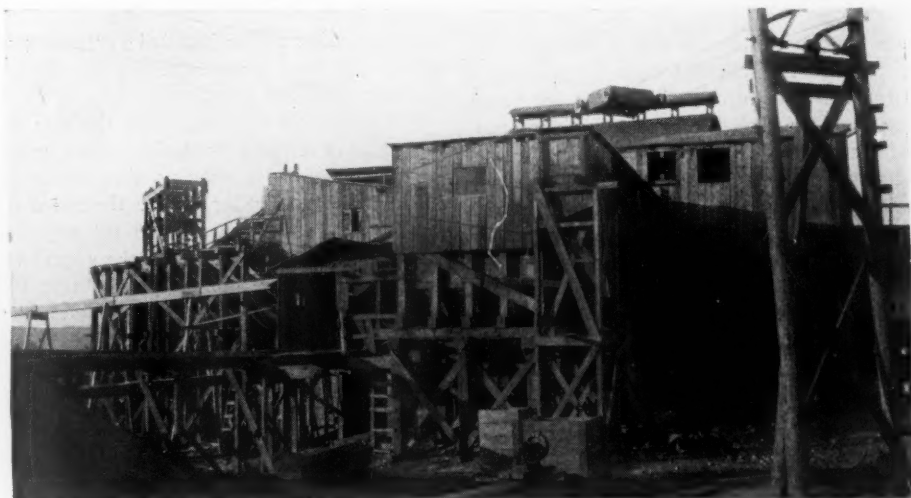
In the Georgia field it is the custom to "gopher" in the small deposits, but the larger operations employ blasting down and steam shovel loading. Light charges of powder are used as the "muck" is soft and shakes down easily. The regular practice is to put down churn-drill holes from the top for two rounds and then put in a line of horizontal holes at the bottom of the face. This keeps the face fairly vertical.

Thompson, Weinman and Co., at Carters-

ville, Ga., have two Marion Model 28 shovels at this work. They also employ an Osgood shovel, Model 18, and two Thew shovels, size O. The same company mines brown iron ore in this district and uses the equipment in one operation or the other according to demand. The bank material is loaded into 4½-yd. Western dump cars and pulled into the plant by dinkies.

The washing practice, like the quarry practice, was brought over bodily from the iron ore fields. For in both fields there is the same necessity of getting a very clean product and especially of getting rid of clay balls and soft rock.

There are no large lumps in the deposit



Washing plant of the Thompson, Weinman Co. at Cartersville. Receiving tramway terminal appears at the right



Washing plant of the New Jersey Zinc Co. at Cartersville, locally known as the "Bertha" plant

and practically everything will go through a bar grizzly with 6-in. openings. All the material falls into a log washer, or rather a pair of them, set to run in opposite directions.

A description of this machine may not be out of place, as it is not commonly used in other rock products industries. It consists of a number of heavy cast-iron paddles set screw-wise around the central "log," or heavy shaft. In most plants nowadays the "log" is built up of steel, but in the Thompson-Weinman plant the old-style wooden "log" is used, a "six-square" stick of oak or other hard timber into which the blades are screwed. Screws for this purpose are cast on the base of the blades.

The "logs" revolve toward one another and the blades mix and churn the material thoroughly. The "logs" have an incline of about 1½ in. to the foot. The screw fashion of the blades moves the material forward

and heavy sprays of water wash away the clay as fast as it is loosened. At the upper end of the log there is only clean rock and clean water, but at the lower end the water is so thick with clay as to be "soupy."

The logs discharge into a revolving screen usually with 1-in. holes. Although it has been so thoroughly washed and rinsed there is considerable unwanted material in the shape of bits of flint, "sand rock" and other minerals that must be removed to make the barytes ready for the market. Some contracts call for as high as 94% pure barytes. The coarse sizes are cleaned by hand picking on a picking belt, the fine sizes are cleaned by jigging.

The experimenter who wishes to try the effect of jigging in order to understand how a jig works, may easily do so with a hand screen and a tub of water. Put about an inch of small gravel in the screen and hold the screen in the tub so that the gravel is about covered with water. Then move the



One of the barytes pits worked by the Thompson, Weinman Co. at Cartersville



Loading barytes by steam shovel at a Thompson, Weinman pit

top, water is put into the jig with the feed and this forms a current that carries off the refuse. When everything is set right the process is continuous and the jig runs with very little attention.

The finest barytes washing plant in the Cartersville district is that of the New Jersey Zinc Co., usually called the Bertha plant. While in its main design the plant is much the same as the others, there are some things that have been adopted from the practice in the zinc fields of the middle western states where jigs are much used.

At the Bertha plant the crude material is dug and loaded into cars in the way already described. Then it is dumped into a hopper from which it is fed to a revolving screen with 4-in. round openings. The oversize goes to a jaw crusher built by the Cartersville (Mo.) Iron Works and the undersize goes to the log washers. There are two of these, 35 ft. long, but only one is in use at a time. The washed product goes to a 1½-in. revolving screen. The oversize of this screen goes to a picking belt and the clean product from this belt to the shipping bins.

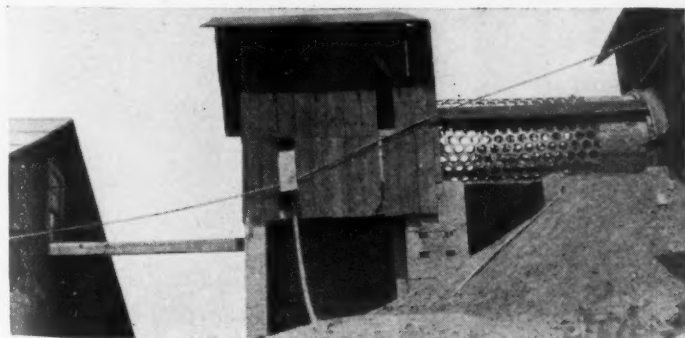
Before jigging, the undersize of the revolving screen is sent to a gravity screening tower where it is separated into ½-in. and ¾-in. sizes. The oversize of this screen is crushed in rolls which are rather different

screen up and down not too violently nor too far. The gravel will have a tendency to stratify and if some pieces of coal, for example, are mixed with the gravel it will be found that all the coal rises promptly to the top.

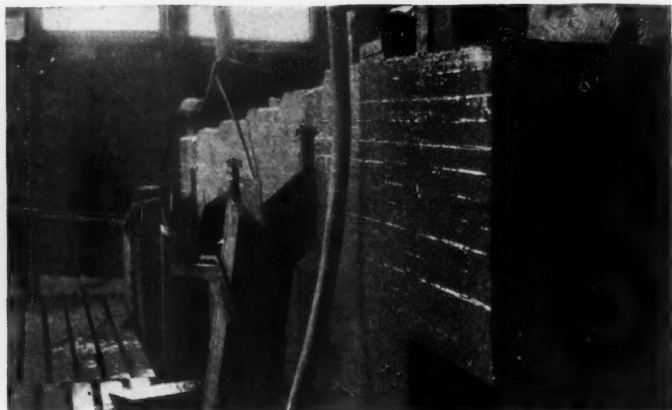
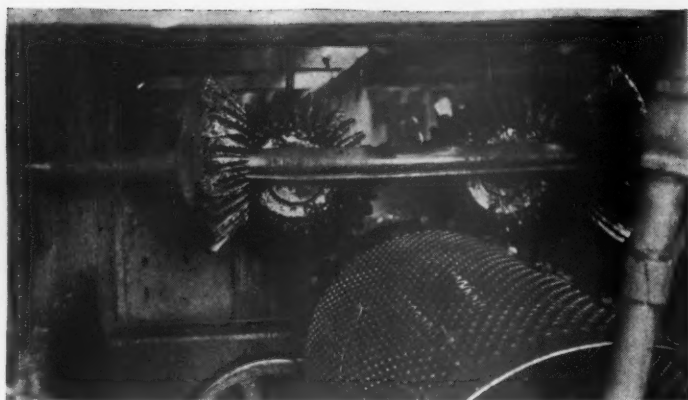
A screen moved up and down in water in this way was the original jig, but in the more modern forms the screen stands still and the water moves up and down. This is

done by putting the screen in the bottom of one compartment and connecting a space under the screen with another compartment in which a plunger moves up and down. The motion of the plunger causes the water also to move up and down through the screen.

There is a hole in one side of the jig compartment through which the cleaned material escapes. The refuse goes over the



Left—Primary crusher and gravity screens at the "Bertha" plant. Right—Tailings pond at same plant



Left—Log washer used at the plants. Note the blades of one log and washing spray between the gears. Right—Three compartment jigs at the "Bertha" plant

from the ordinary sort since they have one flanged and one plain roll. The crushed material returns to the gravity screens and eventually everything is reduced to $\frac{3}{4}$ -in. and $\frac{1}{2}$ -in. and finer before it goes to the jigs.

The gravity screens are of the long slot, perforated metal type and appear to be doing very good work. They are set at a steeper angle than is usual for perforated plates, but the man in charge said that this was necessary to keep the clay from coating the screens.

After jigging the cleaned products go to small bins from which they are removed by a conveyor belt to the shipping bin, which is a square concrete tank holding several hundred tons. Spouts from this bin of the ordinary type are used for loading cars.

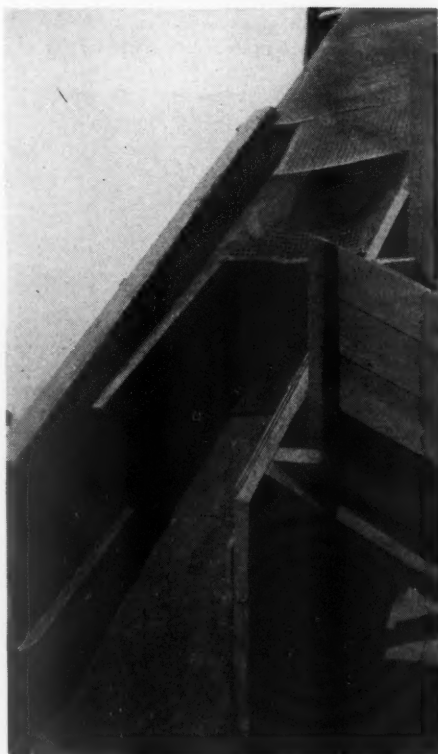
The tonnage shipped from these plants is not large, if one compares it with the tonnage of sand and gravel and crushed stone plants, but this is explained by the fact that the recovery is low. Ground that will yield 15% barytes is considered good. In other words, the washing plant discharges more than five tons of refuse for every ton that it sends to the shipping bin.

The washing practice in this field has a certain historical interest as it was here that mining the deposit as a whole and

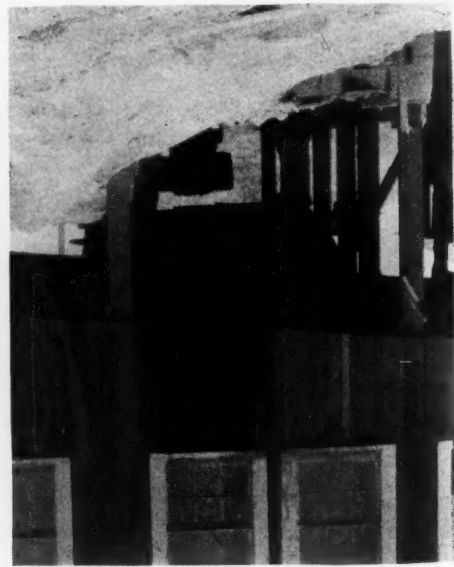
then washing out the foreign matter was first practiced. Up to a period shortly before the war only "gophering" and hand-sorting were practiced, and it was thought that, owing to the "pockety" nature of the deposits, quarrying a full face could never be successfully practiced.

W. S. Peebles, superintendent of the Thompson, Weinman barytes plant, was among the pioneers in the washing of barytes, at that time as an independent operator, and he relates the skepticism with which the buyers of barytes greeted his statement that he could guarantee the washed material to be as clean as the hand sorted. He offered it at first at a low price and found no takers but the same buyers were glad to offer him more than twice as much within a few weeks.

An interesting feature of the Thompson, Weinman plant is the tramway by which the washed product is taken to the shipping bins which are 7200 ft. distant. It is of the "cart type," made by the Interstate Equipment Co. It is provided with an automatic loading and dumping device and a 15-h.p. motor furnishes all the power that is necessary to operate it.



Gravity screens at "Bertha" plant



Left—Drainage bins at "Bertha" plant. Center—Building a jig. Right—Hopper under bins at "Bertha" plant



Panorama of the Ward Sand and Gravel Co.'s plant, the largest in the district

The Oxford, Michigan, Gravel Industry

Practice of a District Which Has Worked Out
Unusual Methods Adapted to Its Own Conditions

By Edmund Shaw
Editor, Rock Products

OXFORD, MICH., is a town of 1600 people, about 35 miles north and west of Detroit, and probably it holds the record as a shipping point for sand and gravel. In the height of the season as many as 400 cars have been shipped daily.

It is one of the few places where conditions are just right to build up a large sand and gravel industry. There is first of all nearness to a big market (Detroit) combined with excellent transportation facilities. And next, the quality of the material is excellent, and finally, the deposits are large enough and deep enough to insure continuous working for many years.

The deposits are of glacial origin made up of kames and outwash aprons, and the lines of seasonal flows may be seen in the faces of all the pits. The deposits contain somewhat more sand than gravel, the usual sand percentage being 60%, although this varies in different parts of the deposit. There is a fair amount of oversize and all the plants have crushers. In some cases the crushed oversize is 20% or more of the gravel product.

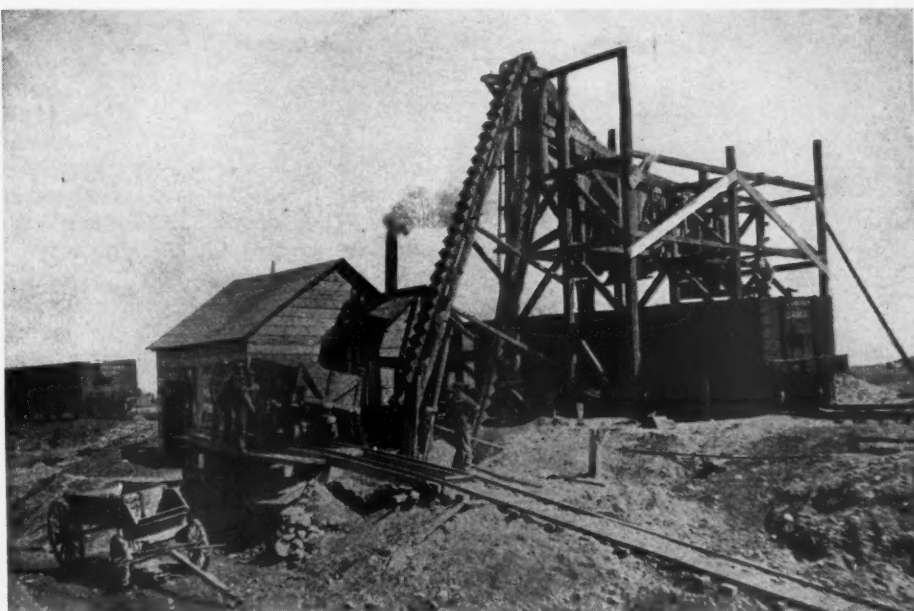
With one exception all the plants lie to the east of Oxford and extend for something over two miles. At the extreme north is the United Fuel and Supply Co.'s plant, which uses steam shovels for excavating. Next comes the Detroit-Oxford Gravel and Stone Co., usually called "Smith's plant," which also uses steam shovels. The next in line, which is just at the edge of town, is the plant of Fuller and Becker, a dredging plant. The plants to the south are that of the Ward Sand and Gravel Co., the largest producer in the district, and the plant of the P. Koenig Coal Co. Both these are dredging plants. To the west of the last named and on the other side of Oxford, is the plant of the J. C. Stewart Co., which uses a cableway drag-

line for excavating. It is also the only plant not served by a steam railroad. It is on a spur of the interurban electric line known as the Detroit United Railways.

All the plants use electric power, purchased from the Detroit-Edison Co. except the Stewart plant, which uses power from

loaded production begins again and the stockpiles are filled up for the next day's loading.

When one thinks of a sand and gravel plant one has a mental picture of large bins surmounted by revolving screens and a conveyor belt running up an 18-deg. incline to feed the screens. With one exception the



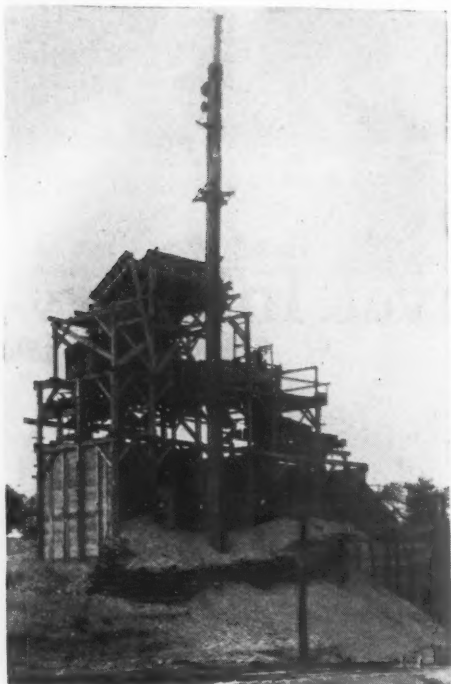
The first sand and gravel plant in the Oxford district built by W. O. Smith in 1911

the electric railway company, and therefore has 600-v. direct-current motors.

Plants run day and night, but this does not mean that all of them run continuously. At some of them the practice is to run steadily through the night and to allow the sand and gravel to drain in the stockpiles so that it is fairly dry when it is ready to be loaded on the cars. After the cars are

plants at Oxford do not look like that at all. One sees along the horizon various trestles of considerable length, some supporting pipe lines, others, conveyor belts, and others, "sand flumes," a device peculiar to this district. They have a "spread out" appearance and one might think that a large number of men would be required to cover so much ground. But the contrary is the

case. Costs are probably as low in this district as anywhere and the tons per man production is high. According to figures given the writer at two or three plants the labor-power-supply cost of production is only



Plant of the J. C. Stewart Co. which uses a cableway dragline for digging the bank

about one-half of the average figure for the sand and gravel plants of the country.

Some of the peculiarities of the practice in this district are: The use of the sand flume spoken of above for collecting sand; the use of booster pumps instead of relays in the dredging plants; the use of gravity and shaking screens; the use of stockpiles for bins (although this is fairly common in other districts) and the arrangements for loading cars rapidly.

The sand flume is a long narrow box or sluice, perhaps 6 ft. wide and 6 ft. deep. The length varies, but in one average plant the length is 160 ft. This inclination is an inch to the foot or perhaps a little more, although this inclination is varied and the flume has

a flatter grade where fine sands are to be caught.

Vertical partitions are placed in the flume, say 15 to 20 ft. apart. These do not reach to the top of the flume, so the water runs over them in a series of long steps. Behind each of these partitions are the discharge holes. In one plant these were fitted with 1-in. pipe nipples about 2 in. long and the bottom of this nipple was covered with a flat plate that could be swung aside by means of a rod that reached to the outside of the flume. By partially closing the pipe with the plate the discharge may be regulated as desired.

Each flume has a good many of these discharge valves and it is a considerable job

mechanically vibrated screen has recently been installed at the Fuller and Becker plant.

The washed and screened material, in all the plants but the Smith plant, falls into stockpiles or ground bins. Partitions between the stockpiles keep the various products apart. Underneath all the piles is a concrete lined tunnel in which is a conveyor belt. Gates in the roof of the tunnel allow the material to flow on the belt and be carried to the loading plant. The use of the long stockpile fits in well with the sand sluice, which deposits the sand for its whole length, and it is possible that this is the sand flume's chief advantage over other forms of sand collectors.

The arrangement for loading cars at all



The Fuller and Becker plant which uses a 15-in. dredge to dig the material

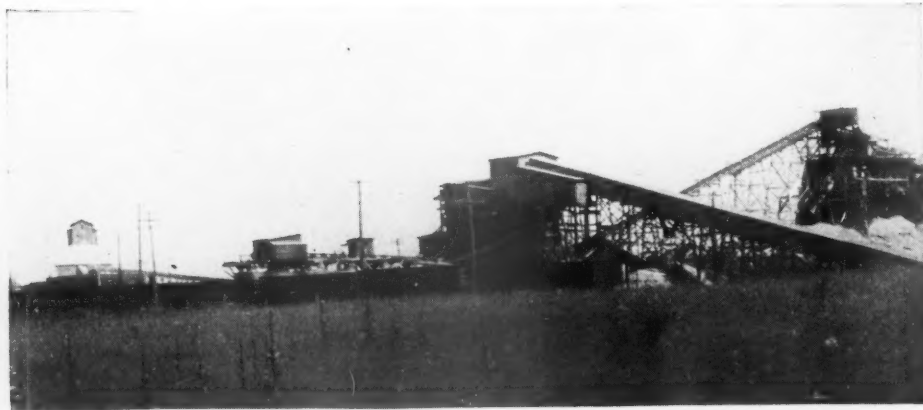
to look after them. At one plant three men were employed at this work, although one at times had other duties. A recently devised type of valve for these flumes has three valves in a gang so that the three may be regulated by one rod, and this lessens the labor somewhat.

Revolving screens are used, especially for scalping screens, but there are more gravity screens and vibrating screens in use. Some of the last named are electrically vibrated and others mechanically. A new type of

the plants visited are excellent. A typical case might be that of a 36-in. belt in the tunnel under the stockpile which brings the sand or gravel to small bins set over the track. The belt travels at 400 ft. per minute and is run very full. The bins are not for storage but only to hold the belt discharge while cars are being shifted. Cars are pulled through under the loading spouts by car pullers.

The whole loading operation may be handled by one man who stands on a platform above the cars. He can start and stop the belt conveyor and pull the cars through by having all the electrical controls on the platform. The bin gates are worked by levers at the platform. Of course other men are needed to ride the cars down to the storage track and to attend to cooping the cars, if they need it, but outside of this one man can do everything. Ordinarily a car is loaded in three minutes, but this time has been beaten by several seconds on occasion.

Pumping has been highly developed. The regular practice has been to use 15-in. pumps on the dredge and boosters of the same size. Pipe line velocity is kept at 14 to 15 ft. per second. Manganese steel pipe is used, another feature said to have been first introduced in this district. And for cutting the gravel and sand a "jet head" is placed at



Plant of the United Fuel and Supply Co. which has an unusually large crushing department

the suction, which is another feature first introduced (on a large scale) in this field.

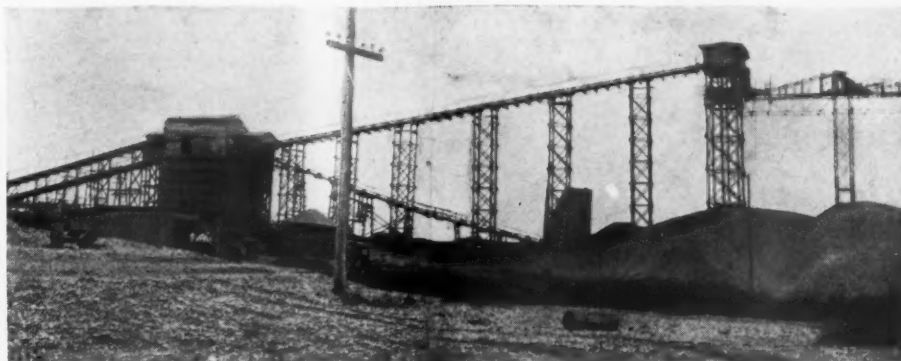
Recently the Ward plant has been experimenting with a system that may supersede pumping of the usual kind. It is an application of the "eductor" or "hydraulic elevator," which works on the same principle as the steam injector for feeding boilers, except that a water jet instead of a steam jet is used. The great advantage of the method is that it reduces the cost of wearing parts since practically all the wear is confined to the "throat" of the eductor which is small and not hard to replace. There is a further advantage in the apparatus being lighter than the usual pumping unit so that it may be placed on a smaller dredge hull.

There is nothing new about using an eductor for handling sand and gravel as it was tried out many years ago in the placer mining fields of Colorado. It has also been used in regular sand excavation and on installations of the kind, made by George B. Massey, was described in *Rock Products*, issue

The Ward plant, aside from the pumping system mentioned, was described in *Rock Products* for September 22, 1923. It has an

Acme jaw crusher crushes the oversize.

The P. Koenig Coal Co.'s plant, beyond the Ward plant, on the same side of Oxford,



The screening department of the Ward Sand and Gravel Co.

excellent screening system using gravity screens and Mitchell screens. The latter are placed on a trestle on which is a belt con-

veyer has a dredge mounting a 15-in. Morris pump direct-connected with a 500-h.p. Allis-Chalmers motor. A Flory hoist handles the suction and swing lines. This pumps to a booster of the same size and powered with a motor of the same size and make. These pump to the top of a tower in which there is a revolving scalping screen and gravity screens and a No. 8A Tel-smith crusher for the oversize. The sand flume is about 200 ft. long built over a stockpile under which is a 36-in. Brownhoist belt conveyor. This is the newest plant in the field with the exception of the Stewart plant. It was built in 1924.

The Stewart plant, built this year, is quite a different plant from the others, as it employs a 2-yd. Sauerman cableway dragline for excavation. The washing and screening plant was designed and built by the Smith Engineering Co., which furnished the machinery. This includes a scalping screen and sizing screen and an 8A Tel-smith crusher for the oversize. Tel-smith tanks are used for the sand. The cableway dragline is handled by a 100-h.p. Thomas hoist, which is unusual because it has a 600-v. direct-current motor for a power unit. The plant can produce 60 yd. per hour with only three men and the superintendent. Both the Stewart plant and the Koenig plant have been described in recent issues of *Rock Products*.

The Fuller and Becker plant, just north



Plant of the Detroit Oxford Gravel and Stone Co., which uses a steam shovel for digging the bank

of March 14, 1923. But Mr. Ward has introduced certain new features of design which may possibly bring his device to a higher state of efficiency than those which have preceded it. The method was described in detail in the December 26, 1925, issue of *Rock Products*.

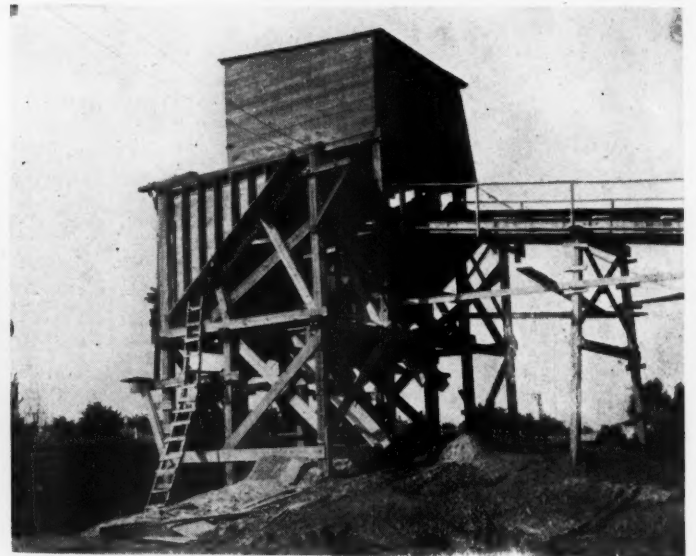
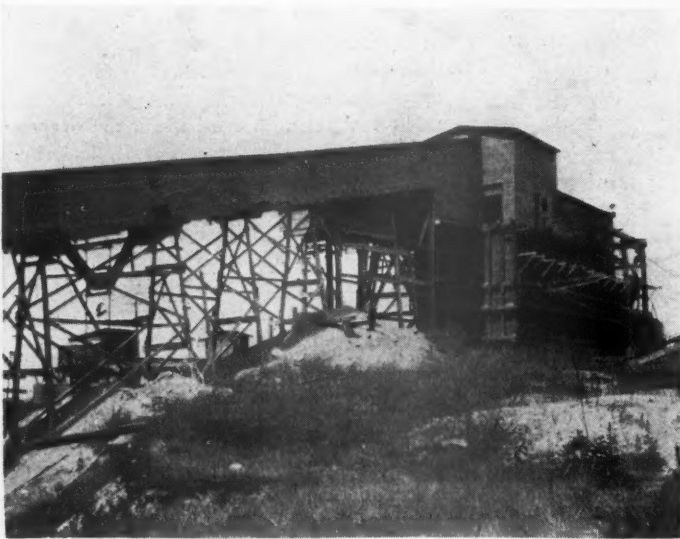
veyor so arranged that it brings the feed to the screen and takes away the undersize which it carries on to the next screen for further separation. Allis-Chalmers pressure pumps are used to furnish the water for the eductors, both the one used for dredging and another as a relay pump, and a No. 7A



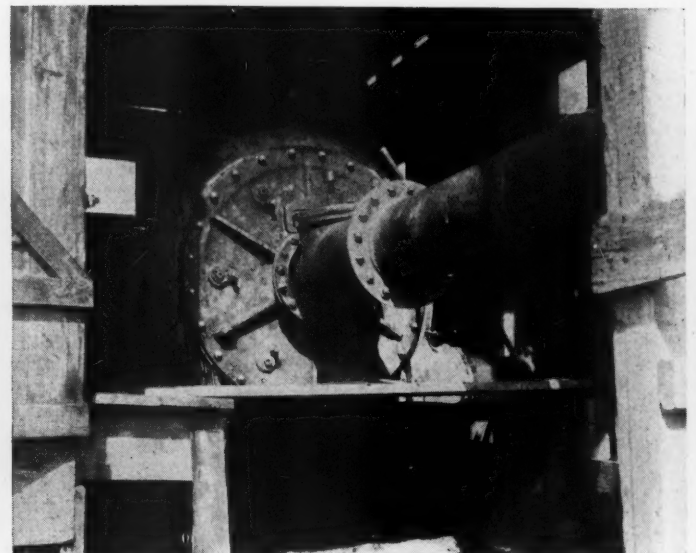
The P. Koenig Coal Co.'s plant, one of the newer plants in the Oxford district



Left—Stone crushing department of the United Fuel and Supply Co.'s plant. Right—Screening and washing department of the same plant



Left—Primary crushing and screening house of United Fuel and Supply Co. Right—Loading hopper at the Fuller and Becker plant



Left—Dredge and pontoon line of the Fuller and Becker Co. Right—Booster pump on shore to which the dredge pumps

of Oxford, has a dredge with a 15-in. Morris pump direct-connected to a 400-h.p. Allis-Chalmers motor. It pumps to a booster outfit with the same kind of pump and motor.



Looking down a sand flume showing the water flowing over the baffles

The screening equipment includes a Link-Belt gravel screen and two Simplicity shaking screens. A Good Roads, Acme jaw crusher, 8x36-in., crushes the oversize. The Simplicity screen is a comparatively recent invention and was first installed at this plant. It is a mechanically vibrated screen.

The plant of the Detroit-Oxford Gravel and Stone Co. replaces what was the first plant in Oxford. This was built by W. O. Smith, president of the company, 14 years ago. Mr. Smith is thus the pioneer in the field and he is also a pioneer in the sand and gravel business, for he had had several years' experience before coming to Oxford and he built the first Michigan sand washer. His

son is associated with him in the business.

The Smith plant appears more like the conventional sand and gravel plant than any of the others. It has Dull screens—the originals of the Link-Belt screens—mounted on bins and a Hum-mer sand screen recently installed to increase the screening capacity. An Acme jaw crusher takes the oversize of the screens and a 24-in. Symons disc crusher is used to crush the gravel to fine sizes when this is required. This plant has no sand flume, a settler of Mr. Smith's devising being used.

An Erie shovel digs the bank material and Koppel side-dump cars, drawn by a Davenport saddle-back locomotive, brings it to the plant hopper. The bank run material goes over a dry screen to take out the oversize for crushing before the material is sent to the washing plant.

The United Fuel and Supply Co.'s plant at the extreme north end of the field also uses steam shovels for excavating, two of Marion and two of Bucyrus make. Davenport locomotives and side-dump cars bring in the bank run to a hopper and dry screen. Oversize is crushed in a No. 8 Allis-Chalmers crusher and passed over a scalping screen, the reject going by a long conveyor belt to a separate stone crushing and sizing plant. From the dry screen the material goes to the washing plant in which there are Link-Belt conical screens and two Hum-mer screens.

This plant is one of the best appearing in the field. Everything is very well constructed and kept neatly painted.

The United Fuel and Supply Co. has recently purchased the Birmingham Sand and Gravel Co. of Detroit and the Detroit Steamship Corp. The boats of this company are used to bring crushed stone and sand and gravel into Detroit from other points on the lakes. This acquisition has given the United Fuel and Supply Co. an unequalled storage and delivery installation for supplying the Detroit market.

Kansas Adopts Flat Royalty Basis on Sand

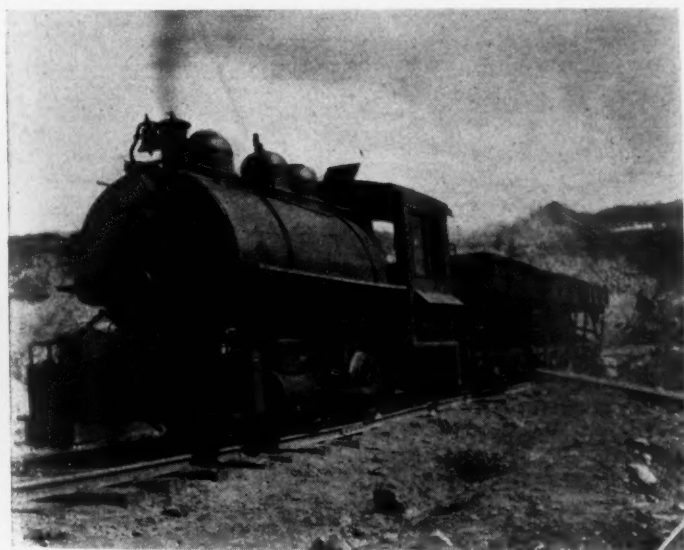
A FORMAL resolution, confirming its recent action in setting the sand royalty at 2 cents per ton instead of 6% of the sales price, on all sand removed from navigable streams in Kansas, was adopted by the Kansas state executive council. The resolution also specifies that exemptions will be allowed only on sales direct to municipalities for sand used in public work, and certified by municipal officers.

The exemption clause is expected to get



W. O. Smith, the pioneer operator in the Oxford district

royalty from about one-third of the sand that has been escaping through exemptions claimed by the sand companies, on the ground that the sand was sold to contractors engaged in public work.—*Topeka (Kas.) Capital.*



Left—Bringing gravel in to the plant, Detroit-Oxford Gravel and Stone Co. Right—Steam shovel in operation at the same plant

A Unique Wallboard Plant in the Pacific Northwest

Western Wallboard Co. of Seattle Makes 200,000 Feet Per Day on a Machine Embodying the Long Experience of the Company's President

THE Western Wallboard Co. makes its "Perfection" brand of wallboard in Seattle, Wash., and its plant has a capacity for 200,000 ft. per day. A considerable portion of its output is exported to Hawaii, Australia, New Zealand, China, Japan, the Philippines and various South American countries. It also makes gypsum blocks.

The plant is rather astonishing from the fact that so large a production is made with a comparatively small capital investment and in such a simple manner. The machines which make this possible are not found in other wallboard plants, as they were all

Plaster Co. of Hanover, Mont., or the Jumbo Plaster Co. of Sigurd, Utah. It is received in sacks at the plant and these are lifted to the upper floor of the plant by a sack elevator. It takes about 1½ hours to unload a 44-ton car.

Sawdust, the filler used with the plaster, is bought locally from one of the many saw mills of Seattle. This is received in hopper cars which are dumped into a track hopper. The sawdust is elevated and conveyed from this to a large bin on the upper floor.

The mixing is by batch. A workman measures the sawdust in a tub which he

The two are filled and emptied alternately and the operation is so regulated that one mixer is ready when the other has been discharged. Water is added in the Blystone mixers, the amount being regulated by eye, judging to the consistency of the material.

The mixer which is ready is discharged by tilting slowly to run the contents on the belt of the machine. A little faster or a little slower rate of discharge does not matter so long as an excess is kept on the belt where it enters the squeeze rolls. Owing to its consistency, the mixture flows out slowly so that by the time one mixer is empty the



Plant of the Western Wallboard Co. in Seattle, Wash. The upper story is of the company's product and has stood six years' exposure to the weather

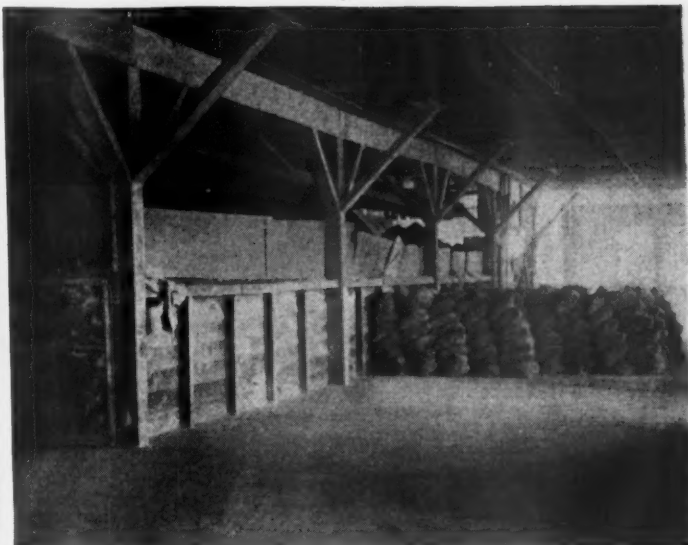
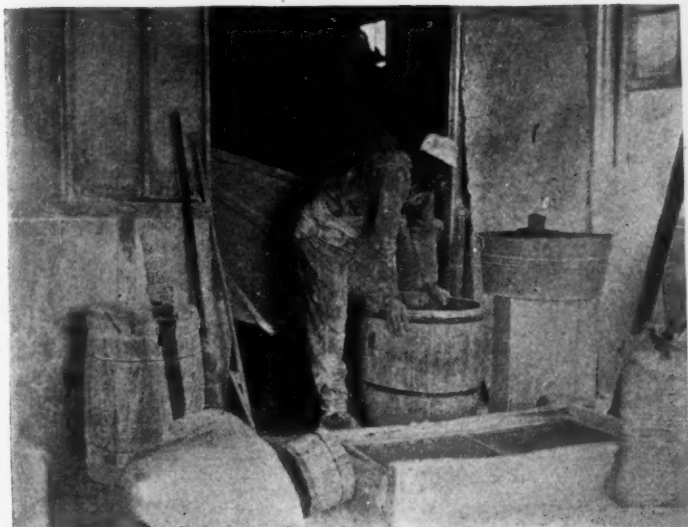
designed and built by G. A. Herzberg, who is the president and manager of the company. His experience in making wallboard goes back for more than 20 years, when he began making it by hand. Out of the experience gained through hand work and experimenting with various machines has come the perfected machine of today.

The company does not make its own plaster, but buys it either from the Hanover

dumps through a screen set in the floor along with a sack of plaster and the necessary retarder (bought from the National Retarder Co.). From the screen the materials fall into a "ribbon" type of mixer of Ehrsam make, but of Mr. Herzberg's design. This gives a dry mix of about one minute. From this the mixed materials go to one of two Blystone concrete 1-yd. mixers of a type familiar to makers of cement products.

other is ready to be poured, making a continuous feed to the machine.

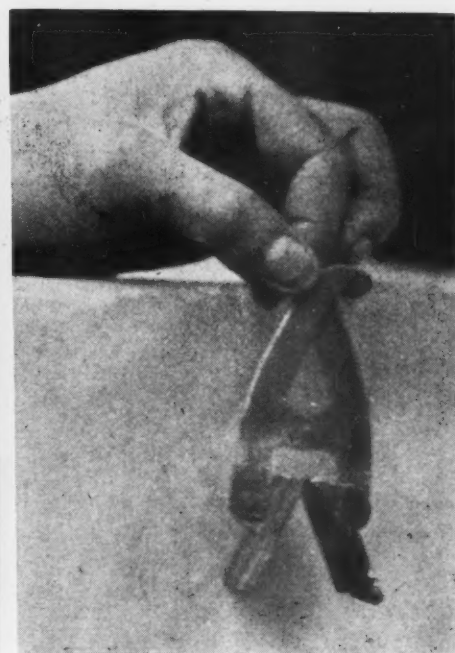
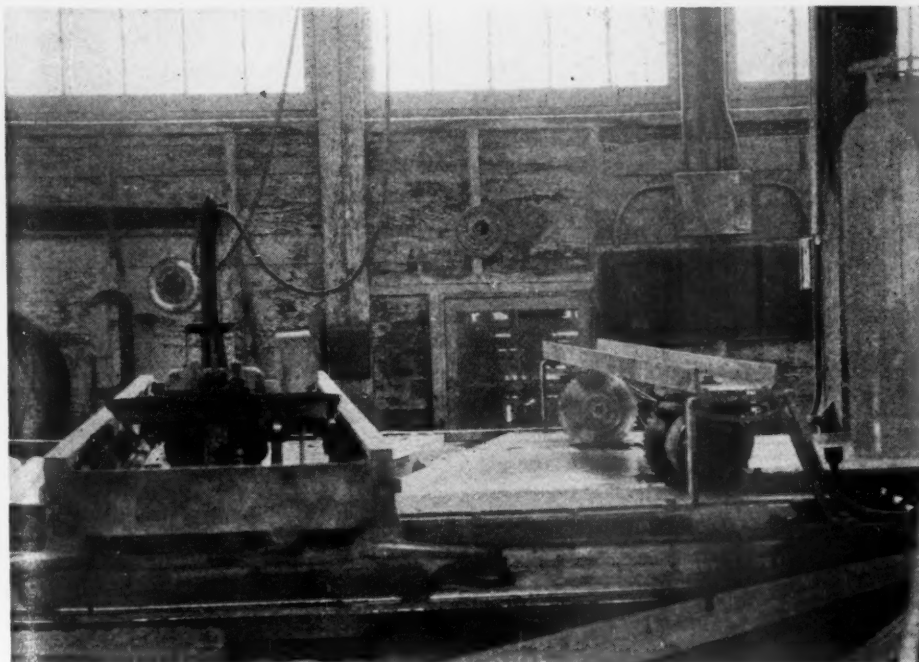
The machine is about 120 ft. long. The board is carried the first 60 ft. on a 54-in. belt and the last 60 ft. on live rolls. The belt carries a sheet of paper on the upper side which is unrolled from a large roll at the end. To keep the paper from sliding sidewise, the belt is moistened along the edge by sprays on the return (under) side.



The sawdust is poured through the screen shown on the right, and the plaster added from the sacks pictured on the left



Left—Rolls of paper ready to be placed on wallboard machines. Right—Sack cleaner; three-quarters of a pound of plaster is recovered from each sack



Right—Trimming and cut-off saws; note diagonal slot for guiding the saw. Left—Patented clip for holding boards while drying

The water seals the space between the paper and the belt so that a vacuum is formed if the paper is lifted and this holds the paper in place. In common words, it is held there by suction. After receiving the plaster the belt with the paper on it passes to the squeeze rolls.

Another roll furnishes the covering paper and this is brought into the squeeze rolls at an angle of about 60 deg. from the horizontal. The excess plaster, which cannot get through the squeeze rolls, forms a cylindrical mass which turns slowly with the movement of the paper and feeds as fast as the squeeze rolls will take it.

These rolls are set to make wallboard $\frac{1}{4}$ -in. thick, which is the standard this company has maintained for a number of years. It is the thickness that wallboard is commonly made on the Pacific coast.

After passing the squeeze rolls the board goes to the end of the belt where it is pushed between two small saws that trim it to the width desired. Boards are made 32 in., 36 in. and 48 in. wide. The 36-in. width is required for shipment to British dominions.

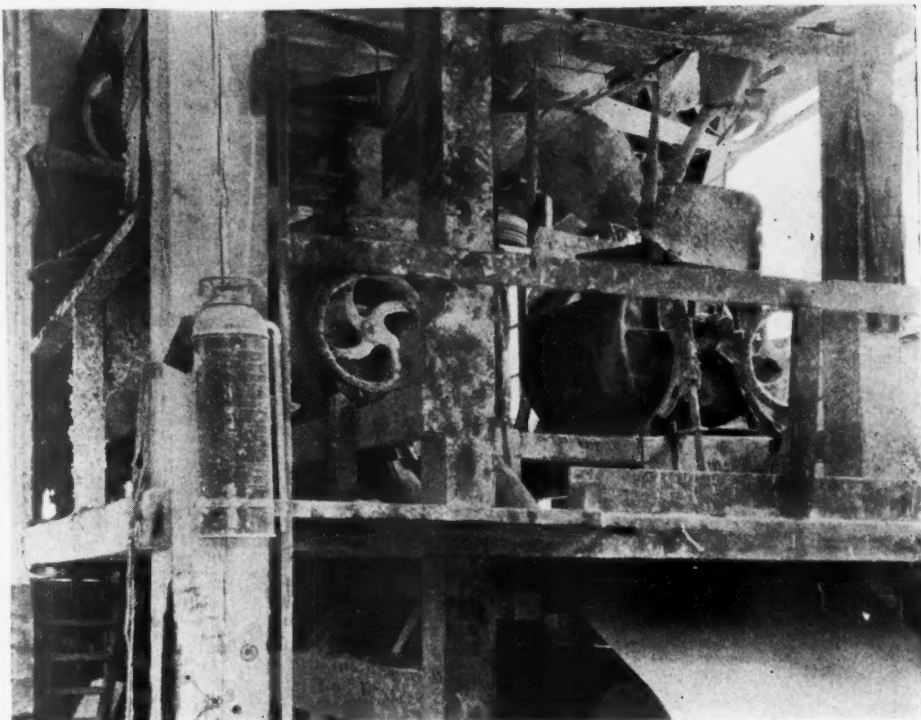
From the trimmers the board passes to the cut-off saw, which travels at the same rate as the board while it is making the cut, thus sawing the board squarely across. This is not a new idea, but the mechanical means by which it does the work is decidedly novel, although somewhat difficult to describe clearly.

In brief, the operation is through an intermittent gear driven at a constant speed. There are different gears for each length of board made, the lengths varying from 6 to 12 ft. The gear has a sector on an arm

that meshes with the pinion but does not turn it through part of the revolution. At the end of this part the movable sector throws the pinion in mesh with the remainder of the gear and is then kicked out and thrown back to its starting place by a spring. When the pinion and gear are meshed the saw begins to cut across the board following a diagonal slot in a plate below the

board. The saw is revolved at 3500 r.p.m. by an independent electric motor. At the end of its run it rides up on an incline and it goes back on a track which is placed so high that the saw cannot touch the board.

The advantage of this particular form of intermittent gear is that the pinion is always in mesh, even when it is standing still. Hence the start and stop can be very closely



The two "concrete" mixers for making the wet plaster mix. The lower roll of paper shows below



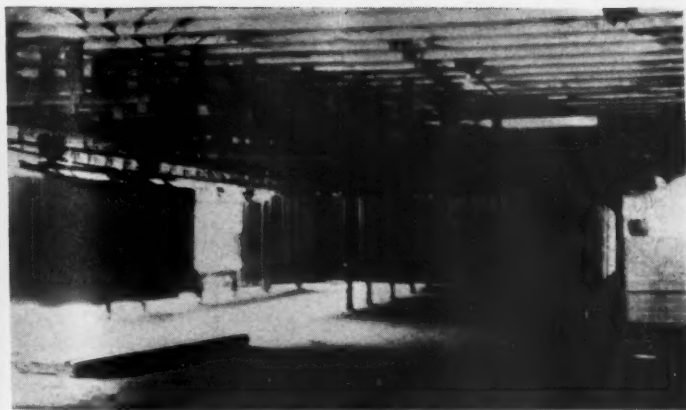
Feed end of wallboard machine showing belt, upper roll of paper, and one of the mixers

regulated, which means that the length of the boards can be closely regulated. Actually they do not vary in length $\frac{1}{16}$ in. over or under the standard.

When the boards leave the belt they go on a set of live rolls that convey it a little farther than the belt, just enough to give the board a slight pull away from the saw. From these they go to a set of rolls that convey it very much faster and with accelerated speed down the incline at the end of the machine. This is to increase the space between boards and give time to the two men who stand at the end to catch the board and pile it on a truck.

This truck stands on a platform that can be raised and lowered by a hydraulic elevator, and this elevator can be set so that the truck sinks at about the same rate as the pile grows by the addition of boards. In this way the top is kept at about the level of the end of the machine and the boards are slid on to the end without lifting.

The boards are very soft, for the plaster has not begun to set by the time they leave the machine. They are also $\frac{3}{4}$ in. narrower than they will be when setting and the absorption of water by the paper is complete. To hold them in shape and to better permit expansion, a dry board, called a "pallet



Left—Green boards on truck which rests on hydraulic elevator platform that lowers as more boards are added. Right—Monorail tracks hung from roof to support frames filled with boards which are pushed into the kiln

board," is placed after every tenth board comes from the machine. As the pallets are placed they stick out $\frac{3}{8}$ -in. on either side of the fresh boards, but as soon as setting is complete the edges of the pile are straight and square.

The trucks are run out on a drying floor where they are allowed to stand at least three hours. Usually a longer time is given, for it does no harm for them to stand indefinitely. But the amount of retarder added is such that there is no setting until 90 minutes have passed, for it is one of the essentials of this process that the setting shall be slow.

At the end of three hours, or longer, the trucks are wheeled under a set of monorail tracks on which the boards are to be conveyed into the kilns. There are light frames on these tracks, each holding a set of clips by which the boards are held in a vertical position. These clips are one of the few new things about this plant which Mr. Herzberg has patented. They work something like an ice tongs; that is, the weight of the board makes them close tighter. As they have flat faces the board is not injured, but nonetheless considerable experimenting was necessary to get the proportions right so that

the clips would hold without squeezing the board too hard.

The frames which hold the clips are joined together by links to form a train as they are pushed into the kilns. Hence the removal of dry boards from the far end of the kiln pulls green boards into the kiln and works the partially dried boards along through to the hot end.

The green boards entering the kiln strike the warm moist air coming from the partially dried boards and it is Mr. Herzberg's opinion that the surfaces actually absorb some moisture at this stage. At all events the center dries out first and this is important both for the thoroughness of the drying and the prevention of warping and shrinking. The boards that come out of the kiln are flat and smooth and "peelers" are unknown in this plant. About 0.4 lb. of water have to be evaporated for each square foot of board dried.

The boards are now ready for crating for shipment unless they are to be of an odd length or width, which cannot be made on the machine. In such a case they are sawed to the required dimensions by an ordinary circular saw.

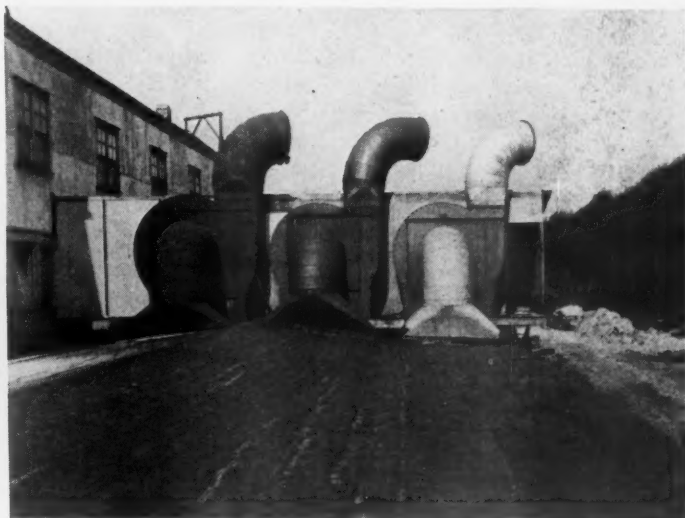
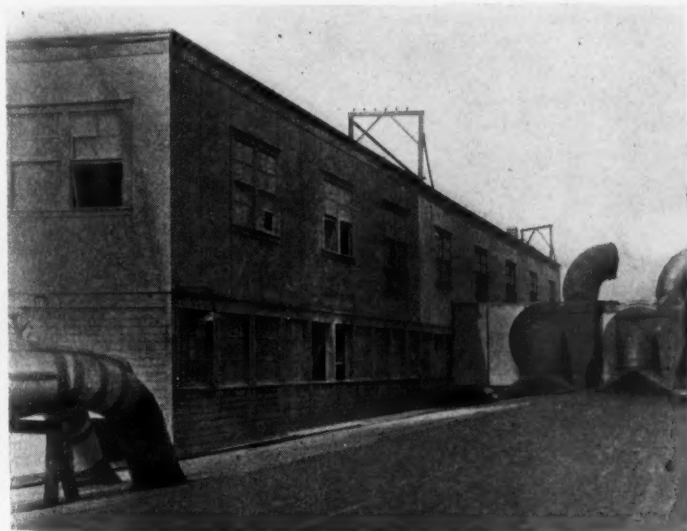
The kilns in which the boards are dried

are three in number, side by side and under the same roof. Side walls and partitions are built of stock wallboard nailed to stud-ding. This construction stands well even in the climate of Seattle, which is very damp during some parts of the year. The kilns are 130 ft. long and, owing to the suction drying system used, the sides must be air tight everywhere. Leaks are prevented by close nailing of the wallboard to the stud-ding.

At the end of each kiln is a large brick combustion chamber partly filled with brick checker work to serve as a reservoir of heat. A Ray oil burner throws a flame into the combustion chamber and this flame is regulated until it is smokeless and then left alone. All the heat regulation is by the admission of more or less cold air through draft openings in the ducts that lead to the kilns. In this way no boards are smoked.

When the fire is started the draft is sent through a stack until complete combustion is secured by the heating of the brickwork to red heat. Then the stack is shut off and the ducts to the kilns are opened.

There are two ducts which lead to each kiln, one above and one below, and recording thermometers give the temperature of

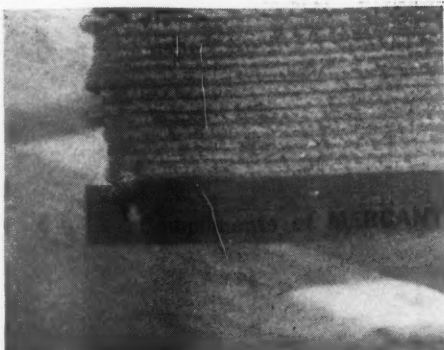


Left—Hot-air ducts and exhaust fans on roof above kilns. Right—Close-up of exhaust fans for removing moist air from kilns

the air in each. Recording thermometers are placed in other parts of the dryer so as to have a complete record of the process. These were made by the Taylor-Rochester Co. and they have made the drying both economical and safe from such accidents as recalcining. Not only do they give a record, but they are watched by the men who use them as a guide to the work.

The hot air and gases from the combustion chamber are pulled through the ducts and then through the kilns by three suction fans, one for each kiln. These were made locally after some experimenting. The pictures show that the three fans are of different sizes. The largest was the first built and it was found too large so that a damper had to be placed in the suction pipe before it would work well. The next made was still a little too large, but the third was just right. Each fan is driven by a 20 hp. motor through a Link-Belt silent chain.

As in all other methods of wallboard making, there has to be a great deal of attention to detail. The plaster and the paper must both be of uniform quality, but the company's requirements are so well known to the makers of these materials that there is rarely a "kick" on quality. The paper is



The green boards expand 3/4-in. in setting. The rule and the dry boards below used as "pallets" show this

plaster following a shutdown of any length. So everything is thoroughly cleaned before starting up if the shutdown has been long enough to allow the plaster to set.

However, since the plaster is retarded to 90 minutes, ordinary shutdowns do not affect it in the least. The process is not quite continuous. At the finish of every truck load of 100 boards the machine has to be stopped for a part of a minute to change trucks and a stop has to be made to put on

employed on the floor above the machine for handling plaster and sawdust and there are three men on the machine, one at the mixer and two piling the green boards on the truck.

A minor economy worth noting is the use of a Wirth bag cleaner for cleaning plaster sacks before these are returned. Each sack after emptying gives up 3/4 lb. of plaster in the cleaner, a considerable saving both in plaster and in freight on the returned sacks.

Crating at times takes more labor than making the boards. Recently an order for export of 1,000,000 ft. was received. There were three different widths of boards in the order and everything had to be carefully crated for ocean shipment and the sailing date was only 10 days ahead. The order was placed on the boat in time to sail, but 45 men were employed in crating during the latter part of the 10 days.

Domestic shipments are put in light crates that hold 12 boards and foreign shipments are in crates of 2-in. stuff that hold 14 boards. Only clear stuff is used for crating foreign shipments, as this has a good value in most ports, if the crates are carefully taken apart.

Although it does not recommend wall-



G. A. Herzberg, president and manager of the Western Wallboard Co., demonstrates the qualities of the quarter-inch board

made by the Paraffine Paper Co., which has two mills near Seattle. It is made with five plies and each ply has its own specifications. The ply which forms the outer surface will not absorb water, while the inner ply absorbs it readily and the others in varying degree. This is important in adjusting the stretch of the paper and the expansion of the board during the setting, and as this is adjusted there is no tearing away of the paper from the plaster and the crystals that form during the setting are not broken. Thus the board retains the full strength of the plaster. The pictures showing the board subjected to the bending test prove that it does not spring out of line more than 10 in. for a 10-ft. board, which is the standard requirement.

Cleanliness is another important detail, as the board can be spoiled by lumps of set

a fresh roll of paper occasionally.

Time studies have shown that these stops do not consume more than 10% of the time and on that basis the capacity of the machine may be figured. The belt speed is 42 ft. a minute and the largest board is 4 ft. wide, which means a capacity of 168 sq. ft. per minute. In 24 hours the machine would make 241,920 sq. ft. without stops and allowing 10% for stops it would make 217,728 sq. ft. This capacity might be exceeded, but with ordinary running the machine will make easily 200,000 ft. in 24 hours.

Very little power and labor is required for this production. One 7½ hp. motor drives the whole machine except for the small motor on the saw. The fans take 60 hp. more when all kilns are running. There are small motors on the mixers and the elevators for raw material. As for labor, two men are

board for outside use, the company uses it for its own buildings and for signs and the like. The upper stories of the factory, the dryer and some small buildings are all of board taken from regular stock. The upper part of the factory has stood the Seattle climate for six years without showing much change, but it has been kept well painted.

A block business is run in connection with the wallboard plant. All molding is by hand in steel molds, and an excellent block is made, the dimensions being true and the block square. But the method is expensive in labor cost and the whole block factory is shortly to be remodeled and labor saving devices installed.

The office of the company is at 4527 Ninth street, Seattle. Mr. Herzberg is the principal owner, as well as the president and manager of the company.

American Road Builders Hold Successful Convention at Chicago

Interesting Machinery Display and Addresses
by Prominent Business Men Are Features

WITH a record attendance of 30,000 and the largest assemblage of highway builders ever gathered to discuss the roads of the western half of the world, the recent convention of the American Road Builders Association closed at Chicago. Representatives of all the leading highway contractors, engineers and road machinery, equipment and material manufacturers of the United States, Canada, Mexico and South American countries were present. Prominent public officials and men of affairs addressed the gathered road builders at their convention meetings.

The equipment displayed was by far the most extensive exhibit ever shown at an event of its kind. It was estimated that over \$3,000,000 worth of machinery and materials were installed in the Coliseum (the main exhibit building) and in adjoining buildings.

The convention proper was divided into two sessions, the engineers' session and the constructors' session. The convention was formally opened by addresses of welcome by Gov. Len H. Small of Illinois and the mayor of Chicago, William E. Dever. Governor Small outlined the history of hard road

building in Chicago and the extent of present and future road building for Illinois. The president of the association, William H. Connell, in his opening address laid particular stress on the large savings, over \$1,360,000,000, which is effected annually in the United States in motor vehicle operating costs by the benefits derived from good highways. This, he declared, was several million dollars more than the annual expenditure on such roads. The work of the Highway Research Board was told by Charles M. Upham, chairman.

At the engineers' session there was discussed at length different problems in connection with highway finance, local and international, selection of pavement in regard to particular burden it was to bear, location, highway routing, future developments in traffic and type of vehicle and highway construction, operation, and maintenance in winter, and subsequent problems due to snow and its removal. The constructors' session was devoted to the particular problems which they had to face such as estimating, cost accounting, operating methods, grading, maintenance, material handling, need for equip-

ment standardization, specifications, more modern technical building of roads and finance connected with road construction.

Speakers of Prominence

Besides the speakers already mentioned the convention was addressed by such men as Charles M. Schwab, chairman of the Bethlehem Steel Corp.; C. H. Markham, president of the Illinois Central Railroad; Frank Alfred, president Pere Marquette Railroad; Thomas MacDonald, chief, U. S. Bureau of Public Roads; C. F. Kettering of General Motors Co. research staff and many other public officials and highway and traffic experts of different states.

The entertainment program was arranged to care for both lady and gentlemen visitors. It included a smoker for the men at the Michigan Avenue Armory and a specially arranged wrestling match; a stag banquet at the Congress Hotel and a supper dance at the Chez Pierre Club.

Henry G. Shirley, chairman of the Virginia State Highway Commission, was unanimously chosen as president for the Road Builders Association for 1926-27.



A section of the machinery exhibit at the Good Roads Show at the Coliseum, Chicago

Hints and Helps for Superintendents

A New Side-Dump Quarry Car

By JOHN RICE, JR.

General Crushed Stone Co., Easton, Penn.

IN THE PAST we have experienced considerable difficulty with the old-fashioned contractors' type of car; first, because the floor of the car is not properly supported for steam-shovel loading; secondly, stone either gets caught in the raised type of door and delays the operation at the crusher, or the doors of the car are broken due to large stones constantly pounding them; and thirdly, when the body of the car is raised to a dumping position, no control of the dis-

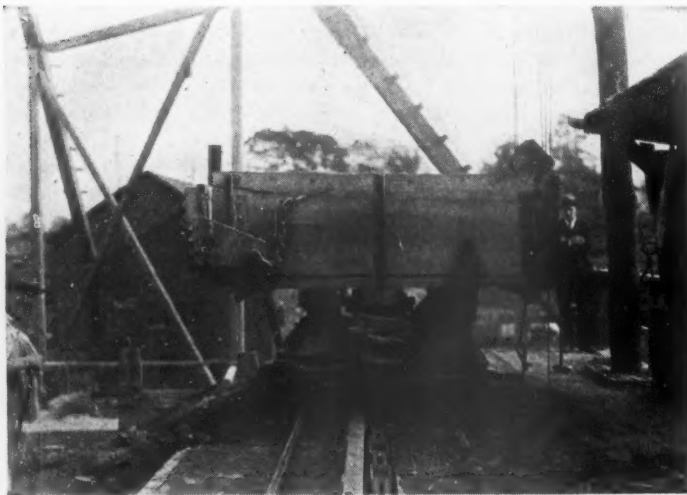
plying this device at our White Haven and Winchester plants, where we are going to use motor-truck transportation systems.

The device itself is extremely simple in operation and design, there being practically nothing to get out of order or to be damaged in any way by falling stone. It may be applied to the contractors' type of car, or any other type of steam-shovel loaded car where a hinged door is used, at a very low initial cost. The principle on which it works is somewhat similar to a crank. The door is hinged at the bottom to the floor of the body and is held in place by a connection from the frame of the truck to an arm fastened on the door. As the body is raised

Non-Destructive Test for Wire Rope May Be Developed

A TEST which could be applied to steel hoisting rope to show whether it is in safe condition or not, and which would not require the cutting of a sample from the rope, would be of great value.

For some time the Bureau of Standards, Department of Commerce, has been investigating the possibility of applying some form of magnetic test to wire rope to determine its condition, as it is known that breaks in the individual wires, worn places, etc., as well as the stress on the rope, affect its magnetic permeability.



Left—Quarry car in upright position before dumping, showing door mechanism. Right—Car in dumping position; note that door is held on same plane with the floor

charge is possible, and this often results in the stone either crowding or blocking the crusher. The truth of the matter is that a contractors' type of car was not, and is not, intended for quarry work.

I therefore set out to build a car that would be better adapted to our work; namely, a car with a floor well supported to withstand shock in loading, a car with a low center of gravity, and with a door, that would fold down and out of the way of the discharge when the car was being dumped; and a body so hinged on the truck that in the dumping position the discharge could be controlled by dropping the body and having the door rise to prevent a further discharge of the stone. I believe that the above principles have been successfully worked out in our new car.

As an experiment at our Geneva, N. Y., plant we built six of these cars which have operated efficiently during the past season. We were sufficiently influenced by the success of same to order six, 12-ton bodies to be mounted on Mack truck chasses and ap-

plying this device at our White Haven and Winchester plants, where we are going to use motor-truck transportation systems. The device itself is extremely simple in operation and design, there being practically nothing to get out of order or to be damaged in any way by falling stone. It may be applied to the contractors' type of car, or any other type of steam-shovel loaded car where a hinged door is used, at a very low initial cost. The principle on which it works is somewhat similar to a crank. The door is hinged at the bottom to the floor of the body and is held in place by a connection from the frame of the truck to an arm fastened on the door. As the body is raised

to dumping position, the hinge of the door curves in towards the anchor point of the connection on the frame of the truck, thereby giving slack to this connection and allowing the door to open. It is so designed that when the body is at approximately a 45-deg. angle, the door will be in the same plane with the floor and held in this position by the connection between the frame of the truck and the arm of the door, due to the fact that this connection is above the door hinge. As the body is lowered to normal or loading position, the door is drawn closed due to the fact that this connection pulls up on the door. Although it is an extremely simple principle by which this device works, it is very difficult for me to explain clearly in a few words its operation.

The Bureau found that wear increases the magnetic permeability for low magnetizing forces, and decreases it for higher values, in other words opposite readings are secured, depending on the magnetizing force employed. A load on the wire produces a similar effect, though it is much less in magnitude, and is probably caused by a redistribution of the internal stress in the wire. This change in magnetic properties is accompanied by an increase in the tensile strength.

Complete details of the investigation are published by the U. S. Bureau of Standards, Paper No. 510.

Application of Wire Rope Lubricants

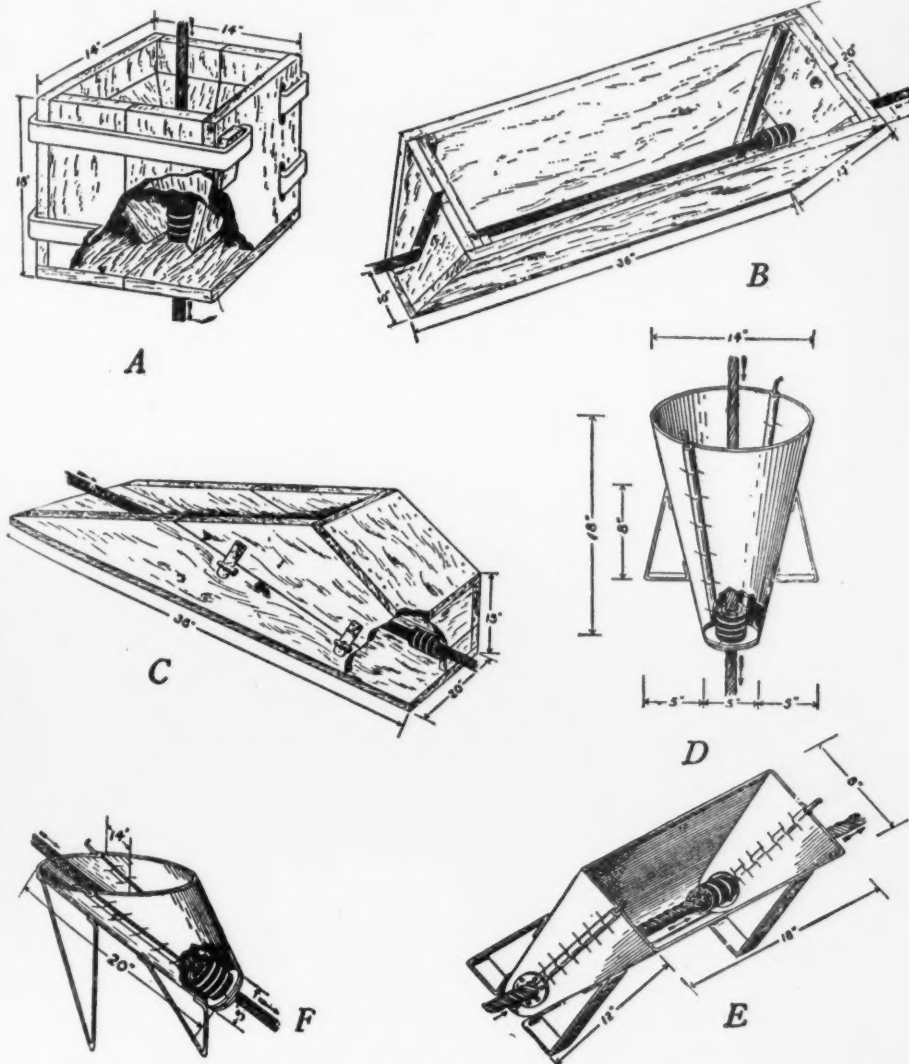
AS a general rule wire rope lubricants, by virtue of their viscosity and inertness, must be applied in heated condition. To merely attempt to daub or paint a rope with such a product at normal temperature would be relatively impossible. Even though the surface might be more or less coated,

the possibility of penetration occurring to any extent would be remote. We must realize that this latter is the secret of effective wire rope lubrication. The amount of wear occurring between the exterior of such a rope and the sheaves is not as marked as that which occurs between adjacent strands when the rope is flexed or bent as in

Pouring a Crusher Bearing

BABBITTING a crusher bearing, even under favorable conditions, presents difficulties. But when the bearing weighs about two tons exclusive of the lining, and that weighs 1200 lb., the difficulties multiply.

Such a bearing was recently babbitted at



Constructional details of typical wire rope lubricating and treating boxes. A, B, and C are of wooden construction. A, to treat a vertical rope; B, a horizontal rope, and C, a rope located at an angle. D, E, and F are similar boxes of metal construction.

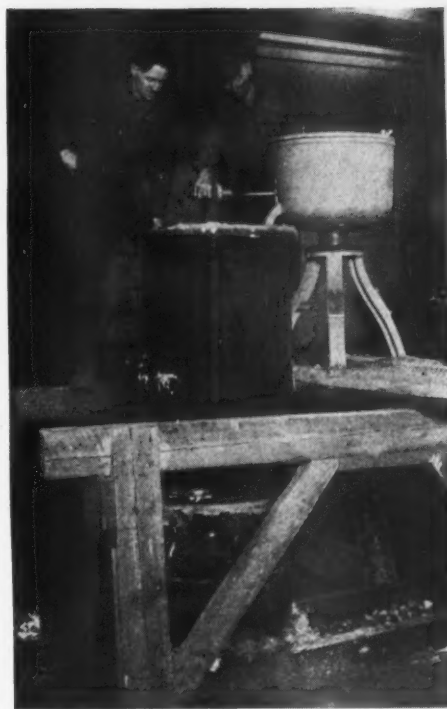
passing over sheaves or hoisting drums.

A very satisfactory method of treating wire ropes is to use a form of box as shown in the accompanying illustration, according to the angle of the rope in question. Such a box can be readily built in the average plant, with suitable provision for rendering it sufficiently tight to prevent the lubricant from leaking out even when reduced in viscosity by heating. The slow passage of the rope through such a bath of heated compound will insure that not only will the surface be coated, but also that the requisite penetration takes place to the inner strands.

Further working of the rope over the sheaves before the lubricant has time to cool entirely will tend to aid in bringing about the maximum of penetration.—*Lubrication.*

the Brooklyn plant of the United American Metals Corp. as a service to one of their customers. The bearing was 6 ft. in length and 2 ft. in diameter.

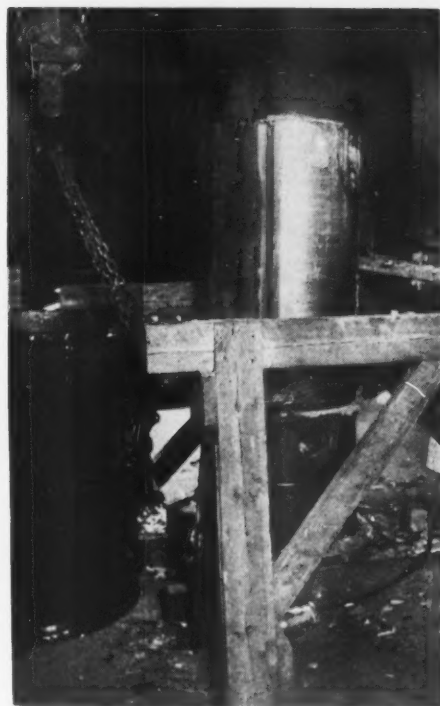
The design of the bearing was such that it had to be poured in a vertical position. Because of the long drop of the babbitt and its weight, the usual practice of sealing the end with putty to prevent the babbitt from running out, had to be dispensed with. Instead, a circular plate of sheet-iron with an 8-in. hole was cut to the inside diameter of the bearing and jacked tight up against the box and mandrel. As a still further protection, some stiff putty was plastered around the outer edge of the plate. Other parts that needed sealing were packed with rope held into place by putty and cement.



Pouring from elevated melting pot

To heat the box and mandrel, the bearing was set on a pair of rails. A charcoal fire was built underneath, the heat passing through the hole of the sheet-iron plate.

In order to cast the bearing with a single pour and so prevent seams which usually result when the metal is poured with ladles, a bottom-pour gas-furnace was elevated to a height so that the spout looked down into the space between the mandrel and the box. When all preparations were complete, the spout was opened, the metal flowed into the space, striking the surface of the mandrel and filling the box in a single pour.



The finished casting

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co. (common)**	Jan. 19	100	122	123	1 3/4% quar. 25% ex. Dec. 1
Alpha Portland Cement Co. (preferred)**	Jan. 19	100	109		1 1/2% quar. Sept. 1
Arundel Corporation (sand and gravel—new stock)	Jan. 18	No par	34	34 1/2	30c quar., 60c ex. Jan. 2
Atlas Portland Cement Co. (common)	Jan. 18	No par	51	52	50c quar.
Atlas Portland Cement Co. (preferred)		100			2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)**	Jan. 18	33 1/2	44	46	2% quar. Oct. 1
Bessemer Limestone and Cement Co. (common)†	Jan. 15	100	140	145	1 1/2% quar. Jan. 1, 4% ex. Jan. 1
Bessemer Limestone and Cement Co. (preferred)‡	Jan. 15	100	106	108	1 3/4% quar. Jan. 1
Bessemer Limestone and Cement Co. (convertible 8% notes)‡	Jan. 15		120	125	8% annual
Boston Sand and Gravel Co. (common) (r)	Jan. 15	100	61		2% quar. July 1
Boston Sand and Gravel Co. (preferred) (d)	Jan. 15			80	1 3/4% quar. Oct. 1
Boston Sand and Gravel Co. (1st preferred) (d)	Jan. 15			90	2% quar. Oct. 1
Canada Cement Co., Ltd. (common)	Jan. 18	100	102		1 1/2% quar. Jan. 16
Canada Cement Co., Ltd. (preferred) (f)	Jan. 15	100	115 1/4		1 3/4% quar. Feb. 16
Canada Cement Co., Ltd. (1st 6's, 1929) (f)	Jan. 15		102 1/2	103	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6 1/2's, 1944) (f)	Jan. 15	100	94	97	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Jan. 15	No par	22	24 1/2	50c quar. Jan. 11
Charles Warner Co. (preferred)	Jan. 15	100	100	103	1 3/4% quar. Jan. 28
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929 (r)	Jan. 15	100	105		
Cleveland Stone Co.	Jan. 19		145	150	1 1/2% quar., 1% ex. Dec. 1
Connecticut Quarries Co. (1st Mortgage 7% bonds) (s)	Jan. 16	100	103		
Coplay Cement Mfg. Co. (common) (4)	Dec. 16		12 1/2		
Coplay Cement Mfg. Co. (preferred) (1)	Dec. 30		70		
Dolese and Shepard Co. (crushed stone) (a)	Jan. 20	50	73	75	\$1.50 quar. Jan. 1
Eastern Brick Corp. (7% cum. pfd.) (1)	Dec. 9	10	40c		
Eastern Brick Corp. (sand lime brick) (common) (4)	Dec. 9	10	40c		
Edison Portland Cement Co. (common)	Nov. 3	50	7 1/2c(x)		
Edison Portland Cement Co. (preferred)	Nov. 3	50	17 1/2c(x)		
Giant Portland Cement Co. (common)	Jan. 19	50	34	38	
Giant Portland Cement Co. (preferred)**	Jan. 19	50	47	50	3 1/2% s.-a. Dec. 15, plus 10% arrears
Ideal Cement Co. (common)‡	Jan. 18	No par	74	78	\$1 quar. Jan. 2. 50c ex. Dec. 27
Ideal Cement Co. (preferred)‡	Jan. 16	100	106	108	1 3/4% quar. Jan. 2
International Cement Corporation (common)	Jan. 18	No par	67	67 1/4	\$1 quar. Dec. 31
International Cement Corporation (preferred)*	Jan. 18	100	104 1/2	104 3/4	1 3/4% quar. Dec. 31
International Portland Cement Co., Ltd. (preferred)	Mar. 1		30	45	
Kelley Island Lime and Transport Co.	Jan. 18	100	118	120	\$2 quar. \$2 ex. Jan. 2
Lawrence Portland Cement Co.**	Jan. 18	100	110		2% quar.
Lehigh Portland Cement Co.‡	Jan. 18	50	89	92	1 1/2% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially up to 1930) (k)	Jan. 15	100	99	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially from 1930 to 1935) (k)	Jan. 15	100	98	100	
Michigan Limestone and Chemical Co. (common)‡	Jan. 16		24		
Michigan Limestone and Chemical Co. (preferred)‡	Jan. 16		24		1 3/4% quar. July 15
Missouri Portland Cement Co.	Jan. 18	25	65	65 1/2	50c quar.; 25c ex. Dec. 13
Missouri Portland Cement Co. (serial bonds)	May 29		104 1/2	104 1/2	3 1/4% semi-annual
Monolith Portland Cement Co. (common) (c)	Jan. 14		8 1/2	9	
Monolith Portland Cement Co. (units) (c)	Jan. 14		24	25 1/2	
Monolith Portland Cement Co. (preferred) (c)	Jan. 14		7 3/4	8 1/4	
Newaygo Portland Cement Co.*	Jan. 15		120		
New England Lime Co. (Series A, preferred) (h)	Jan. 15	100	96 1/2	99	
New England Lime Co. (Series B, preferred) (i)	Jan. 15	100	96 1/2	99	
New England Lime Co. (V.T.C.) (i)	Jan. 15		23	25	
New England Lime Co. (6s, 1935) (m)	Jan. 15	100	98	100	
North American Cement Corp. 6 1/2's 1940 (with warrants)	Jan. 18		99	99 3/4	2 mo. period at rate of 7%
North American Cement Corp. (units of 1 sh. pfd. plus 1/2 sh. common) (z)					1.75 quar. Feb. 1
North American Cement Corp. (preferred)	Dec. 31		94	99	
Olympic Portland Cement Co. (g)	Oct. 13			£1 1/2	
Pacific Portland Cement Co., Consolidated (\$)	Jan. 14	100	89 3/4	90 1/4	1 1/2% mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)§	Jan. 14		100 1/2	101	3% semi-annual Oct. 15
Peerless Portland Cement Co.*	Jan. 15	10	5 1/4	6 1/4	
Potosky Portland Cement Co.*	Jan. 15	10	10		1 1/2% quar.
Phosphate Mining Co. (1)	Nov. 25		1@5		
Pittsfield Lime and Stone Co. (preferred)		100			2% quar. Apr. 1
Rockland and Rockport Lime Corp. (1st preferred) (d)	Jan. 15	100		98	3 1/2% semi-annual Aug. 1
Rockland and Rockport Lime Corp. (2nd preferred) (d)	Jan. 15	100		70	3% semi-annual Aug. 1
Rockland and Rockport Lime Corp. (common) (d)	Jan. 15	No par		65	1 1/2% quar. Nov. 2
Sandusky Cement Co. (common)*	Jan. 18	100	125	130	\$2 quar. \$3 ex. Dec. 31
Santa Cruz Portland Cement Co. (bonds) (§)	Jan. 14		105	106	6% annual
Santa Cruz Portland Cement Co. (common) (§)	Jan. 14	50		87	\$1 quar. \$1 ex. Dec. 24
Simbroco Stone Co. (pfd.)	Dec. 12				\$2 Jan. 1
Superior Portland Cement, Inc. (new stock) (4)	Jan. 19		45		
Tidewater Portland Cement Co. (common) (3)	Nov. 25		8 1/2		
United States Gypsum Co. (common)	Jan. 19	20	147	148	2% quar. Dec. 31, \$2 plus 15% stock ex. Dec. 31
United States Gypsum Co. (preferred)	Jan. 18	100	114 1/2	115	1 3/4% quar. Dec. 31
Universal Gypsum Co. (common)†	Jan. 20	No par	21	22	
Universal Gypsum V. T. C.†	Jan. 20	No par	19 1/2	20	
Universal Gypsum Co. (preferred)†	Aug. 5		76		1 3/4% quar. Sept. 15
Universal Gypsum Co. (1st mortgage 7% bonds)†	Jan. 20		99	(at 6 1/2%)	
Union Rock Co. (7% serial gold bonds) (y)	Jan. 14	100	100 1/2	102	
Vermont Milling Products Co. (slate granules) 5 sh. pfd. and 1 sh. com. (2)	Dec. 30		\$1 for the lot		
Wabash Portland Cement Co.*	Aug. 3		60	100	
Winchester Brick Co. (preferred) (sand lime brick) (3)	Dec. 16		10c		
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940) (o)	Jan. 2	100	98 1/2	100	
Wolverine Portland Cement Co.	Jan. 16	10	9	9 1/2	2% quar. Aug. 15

*Quotations by Watling, Lerchen & Co., Detroit, Mich. **Quotations by Bristol & Willett, New York. †Quotations by True, Webber & Co., Chicago. ‡Quotations by Butler, Beadling & Co., Youngstown, Ohio. §Quotation by Freeman, Smith & Camp Co., San Francisco, Calif. ¶Quotations by Frederic H. Hatch & Co., New York. (a) Quotations by F. M. Zeiler & Co., Chicago, Ill. (b) Quotations by De Fremery & Co., San Francisco, Calif. (c) Quotations by A. E. White Co., San Francisco, Calif. (d) Quotations by Lee, Higginson & Co., Boston, Mass. (f) Nesbitt, Thomson & Co., Montreal, Canada. (g) Neidecker and Co., Ltd., London, England. (i) E. B. Merritt & Co., Inc., Bridgeport, Conn. (k) Peters Trust Co., Omaha, Neb. (m) Second Ward Securities Co., Milwaukee, Wis. (o) Central Trust Co. of Illinois, Chicago, Ill. (r) J. S. Wilson Jr. Co., Baltimore, Md. (s) Chas. W. Scranton & Co., New Haven, Conn. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on Nov. 3, 1925. (y) Dean, Witter & Co., Los Angeles, Calif. (z) Hemphill, Noyes & Co., New York. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day & Co., Boston. (3) Price obtained at auction by Weilepp-Bruton & Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day & Co., Boston, Mass. (6) Quotations by Bond & Goodwin & Tucker, Inc., San Francisco.

Editorial Comment

Ninety Buried in Mine Blast Believed Lost!—the heading in a Chicago newspaper January 14, 1926. The news dispatch from Wilburton, Okla., describes a *coal dust explosion*, followed by a **Use Lime- stone Dust!** fire which caused this loss of human life.

The proper and adequate use of limestone or gypsum dust, as described in several previous issues of **ROCK PRODUCTS** would have prevented this loss of life. No state in the Union is more abundantly supplied with these materials than Oklahoma. It looks like an appropriate time to create a little public sentiment in Oklahoma in favor of a recognized coal-mine explosion preventive. We hope Oklahoma producers will see the point.

The first really radical proposal for improvement in railroad construction which has come from a railroad man in 50 years, was made by **Concrete Roadbeds for Railways** Frank H. Alfred, president of the Pere Marquette railway, at the meeting of the American Railway Association, held in Chicago recently. And it is a proposal that has the liveliest interest for some of the rock products industries.

Mr. Alfred says what many other engineers have said, that railroad transportation has not progressed so far as other methods for purely engineering reasons. If the railroad is to compete with concrete highways he contends that it must put itself on concrete, thus reducing the cost of maintenance to the lowest terms and providing a roadbed over which trains may be run at almost the speed of airplanes with far more safety than the airplane can ever provide. In a newspaper interview Mr. Alfred said:

"After all we will just be doing for rails what others have done already for the highways. When the good roads movement started lots of us thought gravel would be good enough. But the states went farther and made the very safest and fastest roads possible. That is what I believe we will do with rails."

The Pere Marquette railway has gone farther than to dream about concrete roadbeds. The engineering department has figured out the necessary section for the concrete structure to carry such a traffic as Mr. Alfred sees coming in the not very distant future. A section of this proposed roadbed is published in the December 10 issue of the *Engineering News Record*. The rails are shown carried on a reinforced concrete slab which is 10 ft. wide and 18 in. thick, tapering for 22½ in. at both ends to an edge thickness of 9 in. This gives a cross section area of 13.54 sq. ft. and means that each single track road will use approximately 2640 yd. of concrete per mile, considerably more than is required for the ordinary concrete highway. It will cost money but the public will pay for speed that is safe.

It is judged from talking with producers who attended the hearing before the Interstate Commerce Commission at Kansas City, January 8 and **The Rate 9**, that there is an even greater objection to **Hearing** the kind of increase the railroads are trying to put on rates on sand, gravel and crushed stone than there is to the increase itself. The railroads say they want a general increase of 5%, but the 7½-cents flat increase they propose to put on sand, gravel and crushed stone rates amounts to much more than that. On the ordinary short haul it may be 10% or even 15%. Experience has shown that \$1 is about as much freight rate as a ton of stone or gravel will stand, except in most exceptional cases, and the proposed increase on that would of course amount to 7½%. The average haul was shown to be about 55 miles. In Iowa a 7½-cent increase would amount to 8.9% on the rate for a 55-mile haul, in Wisconsin 10.7% and in Texas 9.4%. This is enough to show that sand, gravel and crushed stone have been discriminated against as regards other products, on which a general 5% increase is proposed.

The 7½-cent rate is highly discriminatory as favoring one plant over another, as the testimony at the hearing brought out very clearly. There are examples in the large cities in the Western territory of plants standing just over the line that marks the switching limits that would have their rates raised 7½ cents while plants just inside would suffer no increase whatever. Furthermore there are plants which because of natural advantages—large deposits, exceptional working conditions and the like—can compete with plants having a shorter haul, which will practically be put out of business if a 7½-cent increase in freight rates is added to their cost of delivered material. On the other hand there are instances in which the plant with the longer haul would be so much favored by a flat increase that it would take away the business of its competitors.

It has been brought out very plainly in this and other hearings that the railroads make more clear money out of sand, gravel and crushed stone than other commodities. While rates may seem low, the low rate is more than **balanced by the fact that cars** are brought in to the plant in lots of five or ten or even a trainload; that the plant spots the cars and switches them to where the railroad can pick them up; that the plants repair and clean the cars at a cost amounting in one case to 85 cents per car for every car handled during the year; and finally, that there are no claims for damage on sand, gravel and crushed stone shipments. It is hard to see why the railroads should wish to put a heavier burden on an industry already paying its full share.

Dexter Portland Bonds Offered

BLAIR AND CO., INC., and Cassatt and Co., New York, are offering \$2,200,000 of the Dexter Portland Cement Co. first mortgage 6% serial gold bonds dated December 15, 1925. Due \$165,000 principal amount on December 15 in each year from December 15, 1926, inclusive, to December 15, 1934, inclusive, and \$715,000 on December 15, 1935.

Authorized issued \$2,200,000. Principal and semi-annual interest, June 15 and December 15, payable at the office of Blair and Co. in New York City, without deduction for any federal income tax not in excess of 2% per annum and without deductions for any Pennsylvania personal property tax not exceeding four mills per annum which the corporation or the trustee may be required to pay thereon or retain therefrom. Coupon bonds in the denomination of \$1000.

Redeemable as a whole at any time, or in part irrespective of maturity, on 30 days' notice at 103 and interest on or before December 15, 1928; thereafter at 102½ and interest on or before December 15, 1930; thereafter at 102 and interest on or before December 15, 1932; thereafter at 101½ and interest on or before December 15, 1934, and thereafter prior to maturity at 101 and interest.

The following information has been summarized by John A. Miller, president of the Dexter Portland Cement Co., from his letter dated December 15, 1925:

History and Business.—Dexter Portland Cement Co., incorporated in Pennsylvania in 1899, is one of the oldest, best known and most successful companies in the cement industry. Located in the Nazareth section of the Lehigh Valley cement district, the Dexter plant is equipped to produce cement at as favorable a cost on board cars as any other mill in the East, and upon the acquisition of the plant and property of the Penn-Allen Cement Co., which adjoins the property of Dexter Portland Cement Co., the company will be the largest unit in the Nazareth section, with a capacity of 2,350,000 bbl. per annum. Both plants are in excellent condition, and their operation under one management should result in substantial economies.

Purpose.—The first mortgage bonds are being issued in connection with the acquisition of the business and assets of Penn-Allen Cement Co.

First Mortgage.—The first mortgage serial gold bonds are to be secured in opinion of counsel, by a first closed mortgage upon all the real estate, plants and fixed assets owned by the company, including the fixed properties about to be acquired from Penn-Allen Cement Co. The properties on which these bonds will be a first mortgage have been appraised by R. K. Meade, a leading authority on cement properties, as having a net sound value (less depreciation) of \$4,675,700.

Earnings.—Combined net earnings of Dexter Portland Cement Co. and Penn-

Allen Cement Co. after property taxes, depreciation and depletion available for interest and federal taxes, as certified by Peat, Marwick, Mitchell and Co., public accountants, have been as follows:

Year ended Dec. 31	Net earnings available for interest and federal taxes
1922	\$245,515
1923	702,669
1924	961,492
1925 (9 months to Sept. 30)	853,766

Net earnings as shown above for the three years and nine months average \$736,917 per annum, equivalent to over 5½ times the maximum annual interest charges on the proposed issue of first mortgage bonds, and for the nine months ended September 30, 1925, were at an annual rate equal to 8½ times said interest charges.

Property.—The Dexter plant is located about one-half mile west of Nazareth, Pa., where the company owns approximately 362 acres of land, about 200 acres of which are underlaid with stone suitable for the manufacture of cement. The quarry from which the rock is taken is immediately adjacent to the mill, and the mix is made directly in the quarry. The mill has an annual capacity of 1,275,000 bbl. of cement.

The Penn-Allen properties, immediately adjoining the Dexter properties, embrace about 251 acres, of which about 80 acres are underlaid with cement rock. The annual capacity of the mill is 1,075,000 bbl.

All offerings are made when, as, and if issued and subject to approval of legal proceedings by our counsel. Interim receipts or temporary bonds will be deliverable in the first instance.

PRICES (Accrued interest to be added)		
Maturities		To yield
1926	.....	6.00%
1927	.....	6.25%
1928	.....	6.40%
1929-1935	.....	6.50%

United States Gypsum Company Financial History

INCORPORATED in Illinois in 1920 as successor to a company of the same name incorporated in New Jersey Dec. 27, 1901. Manufactures all classes of gypsum hard-

FINANCIAL REPORT				
Calendar years—	1924	1923	1922	1921
Net earnings	\$8,825,696	\$6,848,942	\$4,370,771	\$2,639,553
Depreciation	670,590	553,323	470,216	271,418
Contingencies	.....	500,000	300,000	200,000
Federal taxes	988,725	764,696	481,522	465,093
Preferred dividends (7%)	592,076	421,178	418,881	417,785
Common dividends	*4,292,515	1,180,491	619,659	374,670
Balance, surplus	\$2,281,789	\$3,429,253	\$2,080,493	\$910,587
Profit and loss, surplus	\$12,595,681	\$9,045,049	\$5,615,795	\$3,535,302

*In 1924 includes 31% cash and 35% stock dividends. In 1923 includes extra of 20% and four regular quarterly dividends of 1% each. In December, 1922, a stock dividend of 10% was paid and four regular quarterly dividends of 1% each during the year. In December, 1921, 5% was paid in common stock besides the regular cash dividends. These are included in the above amounts shown.

wall plasters and other gypsum products, including cement, wood fibre, concrete, finishing, moulding and pottery plasters, stucco, Keene's cement and hydrated lime; fire-proof partition, sheetrock, wall board, plaster board, tile, beam and column protection, floor tile and roof tile, plaster boards, etc. This company has been for a number of

years the world's largest producer of gypsum (plaster of paris), doing about 40% of the business in the United States. Its principal properties, consisting of mines, mills, quarries, warehouses, are located in different parts of the United States.

Stock.—The stockholders on Feb. 11, 1925, increased the authorized common stock from \$10,000,000 to \$15,000,00, par \$20.

Dividends.—On preferred stock: 1906, 3¾%; 1907, 7½%; 1908, 5%; 1909, 6%; 1910 to 1912, 5% per annum; 1913, 5¼%; 1914, 6%; 1915, 6½% cash and 43% on all accumulations in common stock; 1916 to date 7% per annum. On common, 1% quar. from Dec. 31, 1919, to June 30, 1924; on Sept. 30, 1924, paid 1% quar. and 1% extra; on Dec. 31, 1924, paid 2% quar. and 25% extra; on March 31, 1925, paid 2% quar.; June 1, 1925, paid 5% extra; June 30, 1925, paid 2% quar.; Sept. 1, 1925, paid 5% extra; Sept. 30, 1925, paid 2% quar.; Dec. 31, 1925, paid 2% quar. and 10% extra. On Dec. 31, 1920, and 1921, also paid 5% in common stock; on Dec. 30, 1922, paid 10% in common stock; on Dec. 31, 1923, paid 20% in common stock; on Dec. 31, 1924, paid 35% in common stock and on Dec. 31, 1925, paid 15% in common stock.

President, S. L. Avery; vice-president, O. M. Knode; vice-president, C. F. Henning; secretary and treasurer, R. G. Bear. Office, 205 West Monroe street, Chicago.—*Financial Chronicle*.

Kentucky Rock Asphalt Pays \$5 Extra

THE Kentucky Rock Asphalt Co., Louisville, Ky., has announced that the company has declared a special of \$5 per share on common stock, and an increase of quarterly dividends of \$1.50 to \$2 for the coming year.

The company has enjoyed a sound business during the year 1925, having filled many large orders all over the United States and has more unfilled orders for beginning of 1926 than any other previous year. Operations will be continued during the winter months in anticipation of a larger 1926 business.—*Bowling Green (Ky.) Journal*.

Charles Warner Bonds Called

THE Charles Warner Co., Wilmington, Del., have called certain series "A" 7% 5-year sinking fund gold bonds due April 1, 1929, aggregating \$26,000 for payment January 1 at 104 and interest at the Wilmington Trust Co., trustee, Wilmington, Del.

Blackwater Stone Company Bonds Offered

WILLIAM R. COMPTON CO., St. Louis, Mo., are offering \$85,000 first mortgage 6% three-year sinking fund gold bonds of the Blackwater Stone Co., Kansas City, Mo., dated October 1, 1925, due October 1, 1928. Interest payable at the American Trust Co., St. Louis, Mo., on April 1 and October 1 of each year, without deduction for normal federal income tax up to 2%. Coupon bonds in denomination of \$1000, registerable as to principal only. Callable at 102 on any interest date on 30 days' notice as a whole or in part for sinking fund purposes. American Trust Co., St. Louis, trustee.

The following information has been summarized by R. Newton McDowell, president of Blackwater Stone Co., from his accompanying letter:

Organization—The Blackwater Stone Co. has been organized under the laws of the state of Missouri for the purpose of producing crushed stone and its by-products, comprising rip-rap, screenings, and agricultural limestone. It has been in actual operation since about July 1, 1925.

Management—The officers and directors of the company consist of the following: R. Newton McDowell, president and director; Henry H. Hopkins, vice-president and director; Ben S. Lang, vice-president and director; Wm. R. Compton, Jr., secretary-treasurer; Wm. R. Compton, director; Rhodes E. Cave, director; W. M. Sutherland, director; Wm. R. Humphrey, director; W. J. Brinacombe, superintendent of plant.

Properties—The property of the company comprises 66 acres of land in Cooper county, Mo. It is situated on the Missouri Pacific railroad about 16 miles west of Boonville and about 25 miles south of Marshall. A quarry has been located on this property for a number of years. Since acquiring this property, the Blackwater Stone Co. has erected a complete, modern crushing plant with a capacity of over 2000 tons per day.

Security—The bonds will be secured, in the opinion of counsel, by a first mortgage on all the property of the company owned at the date of the execution of the mortgage. The properties actually cost \$218,804.80, as of September 30, 1925, although this cost has been written down to \$210,098.54 by allowances for depletion and depreciation. This property value, after depletion and depreciation, is equivalent to about two and one-half times the amount of first mortgage bonds to be presently outstanding.

Sinking Fund—The mortgage will provide for sinking fund payments which are estimated to be sufficient to retire the entire issue by maturity. Sinking fund moneys will be applied to the purchase of bonds at not exceeding their call price or for their redemption by lot at that price.

Purpose of Issue—These bonds are issued

to discharge obligations incurred in the construction of additions to plant and equipment, and to provide additional working capital. These additions should result in economies in operation with resultant lower costs.

Earnings—Operations have been carried on only since about July 1, 1925. Net profits for the three months ended September 30, 1925, before depletion, depreciation and amortization of quarry development amounted to \$26,866.67. These earnings are at the rate of over \$105,000 per annum, although production has averaged less than half of the capacity of the plant. With capacity production these indicated earnings should be greatly increased.

Dolese and Shepard Company to Retire Bonds

AT the regular meeting of the board of directors of the Dolese and Shepard Co., Chicago, Ill., it was voted to retire the balance of the \$900,000 bond issue of 6% gold bonds, due 1930. Under the terms of the trust deed, these bonds will be retired at par plus accrued interest after being duly advertised. This will leave the company free from any bonded or other indebtedness.

The authorized capital stock of the company is \$1,000,000 to be issued in 20,000 shares of \$50 par of which only 19,148 have been issued, so that actual capital stock of the issue is \$957,400. The directors at the meeting authorized the customary quarterly dividend of \$1.50 per share on the stock.

Santa Cruz Pays Extra Dividend

THE directors of the Santa Cruz Portland Cement Co., San Francisco, Calif., voted the usual quarterly dividend of \$1 on the \$50 par common stock plus an extra dividend of \$1 on the same payable Jan. 1, 1926.

The company has paid extra dividends of \$1 per year for the past five consecutive years, this being the sixth. The company operates a cement plant at Davenport in Santa Cruz county producing 8500 bbl. per day and owns the plant and more than 1000 acres.

The stock was reduced early in 1925 from \$100 par to \$50 par and the dividend was increased from 6 to 8% at the same time. Consequently the stockholders consider the present year one of accomplishment.—*San Francisco (Calif.) Chronicle*.

Sandusky Cement Extra Dividends

The directors of the Sandusky Cement Co., Cleveland, Ohio, have declared an extra dividend of \$3 a share and the regular quarterly dividend of \$2 per share, both payable December 31. A distribution of bonds of the Toledo, Angola & Western Ry., a subsidiary, to an amount equal to \$4 a share, was also authorized as an extra.

Beaver Portland Gold Bonds Offered

RALPH Schneeloch Co. and Bond & Goodwin & Tucker, Inc., Portland, Ore., are offering at 100 and int., \$400,000 first (closed) mortgage 7% sinking fund gold bonds of the Beaver Portland Cement Co. of Portland, Ore.

Dated November 1, 1925; due serially November 1, 1927-1940. Principal and interest (M. & N.) payable in U. S. gold coin at Bank of California, National Association, Portland, Ore., trustee, without deduction for normal Federal income tax up to 2%. Denominations \$500 and \$1000. Callable by lot from last maturity outstanding on any interest date on 60 days' notice at 102 and interest.

The following data are from a letter of the president of the company, D. L. Carpenter:

Company—Incorporated in Oregon in April, 1913, and in 1919 was acquired by its present owners, under whose management the plant was rebuilt, new quarries acquired, and the market for its product developed. Properties consist of a cement mill of 1100 bbl. per day capacity and limestone and shale deposits adjoining the plant at Gold Hill, Ore., immense deposits of high-grade lime rock at Marble Mountain, and other lime rock deposits at Cheney Creek, Crooks Creek and Colvig Gulch. To facilitate operations at Marble Mountain, company owns approximately one mile of tramway and three miles of standard gage railroad, connecting with the California & Oregon Coast R. R. at Wilderville Station.

In addition to its use in the manufacture of cement, a large tonnage of lime rock from Marble Mountain is sold by the company to paper manufacturers.

Sinking Fund—Trust deed provides that beginning April 1, 1927, company must pay quarterly to the trustee an amount equal to 5 cents per barrel on all cement sold during the preceding three months, this sinking fund to be used by the trustee for the purchase of bonds of the last outstanding maturity, if obtainable at or below 102 and interest, and if not so obtainable, by the retirement, on any semi-annual coupon date, of bonds called by lot at 102 and interest from bonds of the last outstanding maturity. Based upon past average sales of the company's output, all bonds due in 1940 will be retired through the operation of the sinking fund prior to maturity.

Earnings—Net earnings before income taxes and depreciation for the four-year period ending October 31, 1925, have averaged \$127,669 per year, or over four and one-half times the interest charge on this issue, and approximately two and two-thirds times the annual requirement for interest, principal, and sinking fund payments, based on past average sales.

Ideal Cement Pays Extra Dividends

IDEAL Cement Co., Denver, Colo., declared extra dividend of 50 cents on the common in addition to the regular quarterly dividends of \$1 on the common and \$1.75 on the preferred. The extra is payable December 22 and the regular dividends January 2.—*Pittsburgh (Penn.) Sun*.

Why Freight Rates Should Not Be Raised

National Sand and Gravel Association Appears
Before Interstate Commerce Commission at
Kansas City to Protest Against Proposed Increase

THE hearing on the proposal of the railroads to increase freight rates on sand, gravel and crushed stone, in the Western Territory, was held in Kansas City, Mo., January 8 and 9. Commissioner Clyde B. Aitcheson represented the Interstate Commerce Commission, with whom the final decision rests as to whether the increased rates are reasonable or not. He was assisted by four examiners, before whom testimony is sometimes taken independently of the main hearing.

The hearing was held in the ball room of the roof garden of the Kansas City Athletic Club, and the scene was rather imposing. The commissioner and examiners sat at a long table on a raised platform. Below the space was filled with tables at which sat the attorneys representing the different railroads and the attorneys for the various interests which will be affected by a rise in rates. For the increase in the rates on sand, gravel and crushed stone is only one of many increases which will affect practically all products, agricultural, mineral and manufactured in the Western Territory.

Protest Brought by the National Association

The protest against the increase in rates on sand and gravel was brought by the National Sand and Gravel Association, who placed the case in the hands of Fayette B. Dow, a Washington attorney, whose principal practice is before the Interstate Commerce Commission. Edwin Brooker, who is the attorney of the National Sand and Gravel Association in cases connected with freight rates, helped in the preparation of the case and was the principal witness for the sand and gravel producers. Mr. Brooker is well known to ROCK PRODUCTS readers, as he prepares the matter which appears in the Traffic and Transportation department. He is a recognized authority on sand and gravel railroad rates in the United States and his rate exhibit and testimony made the backbone of the case.

The general proposition of the railroads is that added revenue is needed for the roads to pay expenses and a reasonable return on the capital invested and in the main they are asking for a 5% increase in the Western Territory. In the case of sand, gravel and crushed stone they are asking a flat increase of 7½ cents per ton. This method of increasing rates is

sometimes applied when it will affect the relationship between shipping points or consuming points less than a percentage increase would affect it. For example, a percentage increase in the freight rates on wheat might seriously affect the wheat receipts of Minneapolis and Kansas City, favoring one more than the other to an extent that would turn shipments.

It is presumed that the railroads intended to preserve the relationship between plants as far as possible and so substituted the 7½ cents flat increase for a general 5% increase. Mr. Brooker's analysis of the situation showed that a 7½ cents increase amounted to much more than a 5% increase, inasmuch as most sand and gravel shipments are made for short distances and the freight is less than \$1 per ton.

Sand, Gravel, and Stone Give Most Revenue

His analysis further showed that shipments of sand and gravel gave more net revenue to the roads than other commodities, so much more in fact that shippers of sand and gravel were really entitled to a decrease of rates instead of being asked to stand an increase.

It was the opinion of those who attended the hearing that the sand and gravel producers had an air tight case. At least the cross-examination of the witnesses by the railroad attorneys did not develop any leaks nor injure it in any way. This cross-examination was rather perfunctory and it was difficult to see just what the railroad attorneys were trying to bring out. Some questions apparently were intended to develop that sand, gravel and crushed stone had increased so much in value that they could stand an increase in rates, but the testimony was all the other way, so questions of that nature were promptly discontinued.

Development of the Industry

The first witness called was Edmund Shaw, editor of ROCK PRODUCTS. His testimony presented a general picture of the industry and reviewed especially the changes that have taken place in the past few years. These have led to the building of large and well equipped plants in order to make washed sand and gravel that would meet the specifications of highway and other engineers who understood the value of good concrete aggregate and in-

sisted on having it. The gain to the public from this was shown in the increased strength of highway concrete obtained at no greater cost. (In California, for example, the strength of highway concrete has increased from between 2000 and 3000 lb., in compression to between 4000 and 5000 lb., since the adoption of rigid specifications for sand, gravel and rock.) It was further brought out that such plants could only exist by serving considerable areas and that every increase in freight rates restricted the area that they could serve. Increased rates in sand and gravel cannot often be passed on to the consumer. The effect is to drive the consumer to use inferior material from way-side pits, and deterioration of concrete sidewalks, curbs and foundations, and even of concrete highways, may be shown to have come from the use of such inferior material.

There was no cross-examination of this testimony and it was immediately followed by the introduction of Mr. Brooker's exhibits which contained an analysis of the freight rates on sand and gravel in the Western territory. These exhibits were printed in two large pamphlets, with pages 16 in. long and 11 in. wide. Some idea of the immense amount of research and calculation involved in their preparation may be had from a study of a single average page. This contains 12 columns of figures in each of which was 35 entries, a total of 420 entries in all. Some of the pages contained more than 1200 individual items. So many of these exhibits were required to present to the commission, the railroads, and others interested, that 485 lb. of them were trucked to the court room and it was said that the supply was short.

Figures of Production

The exhibit begins with the U. S. Geological Survey figures of sand and gravel production in the territory in which it is proposed to increase rates. This includes the following states: California, Texas, Wisconsin, Minnesota, Washington, Missouri, Iowa, Louisiana, Kansas, Nebraska, Oregon, Arkansas, Oklahoma, Wyoming, Utah, New Mexico, Montana, South Dakota, Nevada, Colorado, Idaho, North Dakota, and Arizona. These names are in the order of production and the production ranges (in 1923) from 7,205,516 tons for California to an amount too small to be separately reported for Arizona. The total production for this

Western territory was 47,959,888, in 1923, and this is a little more than double the production in 1917. On the succeeding page is the crushed stone production ranging from 6,522,700 tons for California (in 1923) to 54,730 tons for Arizona in the same year. The total 1923 production of crushed stone was 18,215,670 tons, which is almost double the 1917 production of 9,939,908 tons, which shows that the productions of sand and gravel and of crushed stone have increased at the same rate.

Commissioner Aitchison asked Mr. Brooker what he proposed to show by such an exhaustive analysis of rates. Mr. Brooker replied that in the first place he would show that sand and gravel were already bearing more than their full share of the burden of freight rates and any increase would be an addition to rates which were already unjust. He went on to show that sand and gravel was shipped under conditions which were far more favorable to the railroads than the conditions presented by other commodities. Among these conditions are: that railroads can set in lots of five, ten, or even more cars, up to a trainload, and they have nothing more to do with them. The plants spot the cars, switch them, and run them onto a track from which the railroad can pick them up with no further trouble than backing in and coupling on.

No Claims for Damages

In the sand, gravel, and crushed stone business there are no claims for damages. The use of open-top cars comes at a time of the year when such equipment is at the lowest demand for coal shipments, and the sand and gravel companies clean and repair the cars at a cost which is not inconsiderable.

The revenue per ton mile from sand and gravel is greater than with many other commodities. To prove this, Mr. Brooker gave some examples. In the case of cotton seed products the revenue is no greater than from sand and gravel, although the rates are twice as much. Sand and gravel produce more per ton mile revenue than ice, which has a much higher freight rate. The same thing is true of fence posts. Live stock would need five times the sand and gravel rate to pay the same revenue. These examples were all taken from Texas where the Shreveport rate applies.

Mr. Brooker was interrupted at this point by one of the railroad attorneys who wanted to know the average length of haul on sand and gravel. He said it was between 50 and 60 miles.

Going on with his testimony he showed a comparison with intrastate rates in the same territory which proved that interstate rates were higher. Then he gave a comparison with interstate rates from Arkansas City to various points on the Frisco road. The average revenue per car mile was 38.4 cents, which he compared with the average revenue per car mile of 23.6 cents for all commodities on the Milwaukee road.

The rates of the Northwestern states were

compared with the rates of Southwestern states and it was shown that the former were slightly lower. A great many other comparisons were made, many of which are too technical to go into here. But in all of these, two points stood out plainly. One was that sand and gravel was already paying more than its full share of the burden of rates and the other was that the commissions which fixed intrastate rates had appreciated this and had lowered intrastate rates below the corresponding interstate rates.

Choosing an example at random from Mr. Brooker's exhibit, to show how heavily sand

nesota for the same length hauls are \$4.00, 63.6 cents, and 37.5 cents. The above are only a few examples, but they serve to show the truth of Mr. Brooker's contention.

Proposed Increase Is More Than 5%

Discussing the proposed flat increase of 7½ cents per ton, Mr. Brooker showed that the railroads were in error in figuring that this amounted to only an average increase of 5%. It ran all the way from 2.5% on the longest haul to 18.5% on the shortest and was something between 5 and 10% on the average haul. The effect of so large an increase as 18.5% on the short haul would, in Mr. Brooker's opinion, inevitably drive the producers to shipping by motor truck so that the carriers would lose instead of gain by the increase.

The question of the distribution of fractions in the rates came up and Mr. Brooker showed that applying a rule that is sometimes used by carriers the rate increase of 7½ cents might in some cases amount to more. One of the railroad attorneys interposed at this place to say that his road was willing to go on record that it would in no case take more than the 7½ cents that had been asked for.

In another exhibit Mr. Brooker showed that \$1 was about the limit that a ton of sand and gravel would stand as a freight rate except in most unusual cases. "The dollar rate appears to be a deadline" was the way Mr. Dow put it. Mr. Brooker said that if the railroads would look into the sand, gravel, and crushed stone business they would find that a lowering of interstate rates would materially add to the revenues of the railroads.

Cross examination by Attorney Bell of the Southern Pacific R. R. brought out nothing detrimental to the case Mr. Brooker's testimony had made. He attempted among other things to show that crushed stone had increased in plant price since rates were raised, but the document by which he tried to prove it was not offered in evidence and the commissioner would not permit the line of questioning to go on. It was a labor board report showing the cost of railway materials.

Frank E. Lane, Chicago representative of the Janesville (Wisconsin) Sand and Gravel Co., was the first of the producers called upon. His company's plant produces 7500 tons per day, shipping to Madison and Milwaukee, Wis., and to Chicago. Shipments by rail run as high as 143 cars daily. Chicago is the largest market, taking about 50% of the production. The company maintains track scales and cars are always loaded to the proper amount. Shipments to Chicago go in trainloads or lots which trains pick up to fill out tonnage.

High Cost of Coopering Cars

The cars are returned empty and need "coopering." The cost is 85 cents per car for cleaning and coopering figured on all the cars loaded during the season. The average carload is 55 tons. (Mr. Brooker



Edwin Brooker, Rate Attorney for the National Sand and Gravel Association

and gravel have been burdened with freight rates, one may take the rate on the C. & N. W. R. R. between different states in the Northwest, including Illinois, Iowa, Minnesota, Michigan, Wisconsin, and North and South Dakota. The rate per ton prior to G. O. 28 was 40 cents for a 5-mile haul and 90 cents for a 55-mile (the average) haul. This was raised to 60 cents by G. O. 28 and to 80 cents by Ex Parte 74, an increase of 100% for the 5-mile haul, and to \$1.10 and then to \$1.50, an increase of 66.7% for a 55-mile haul. These rates have since been reduced so that the present rate shows an increase of 75% on the 5-mile haul and 55.6% on the 55-mile haul. To show the comparison between interstate and intrastate rates, one may choose the rates in Minnesota. The intrastate rate for 5 miles is 40 cents, and for 55 miles it is 70 cents. The corresponding interstate rates, shipping out of Minnesota, are 60 cents and 80 cents. The revenues per car mile are illuminating. Under the interstate rates in force on the Northwestern lines the revenue per car mile is \$7.75 for a 5-mile haul, \$1.34 for a 55-mile haul, and 66 cents for a 200-mile haul, the longest for which rates are given. The revenues under the intrastate rates in Min-

had showed in his testimony that the average load for the Western territory was 54.7 tons.)

He described the process of producing sand and gravel as practiced by his company. Questioned as to price, he said that sand and gravel were selling at a lower price than they sold before the war. Seventy-five per cent of the delivered cost in Chicago is freight. The market is very sensitive to slight changes in price and a fraction of a cent on 100 lb. increase in freight rate might exclude the product of a plant from the market. Prior to the war, shipments were made to points 200 miles away; now 100 miles is about the limit. The rate from Janesville to Chicago before the war was 30 cents per ton, and it was successively advanced to 50 cents, 55 cents, and 80 cents per ton, to be later reduced to 70 cents, and then to 65 cents and again advanced to 70 cents, the present rate.

In the Chicago market his company's product has to meet competition with sand and gravel brought in by boats and also with the product of Illinois and Indiana plants on which no increase in freight rates is proposed.

High Freight Rates Help Wayside Pits

J. E. Thomas of Mason City, Iowa, followed. His plant produces 30 cars a day and he ships into Illinois and Minnesota and formerly shipped into Nebraska. Interstate rates had raised until Nebraska shipments had ceased and Minnesota shipments had almost ceased. One dollar was the limit that sand and gravel would stand in rates. If rates were more than that people would turn to wayside pits and use inferior material.

His plant maintained 3000 ft. of track and spotted and switched all cars. Coopering cars cost 75 cents per car on all cars handled. The railroad used sand and gravel loaded cars to make up tonnage on trains and often held them for several days on that account.

On cross examination Mr. Thomas said that the competition in Minnesota comes from wayside pits.

H. M. Robbins of the Robbins-Young Sand and Gravel Co. of Minneapolis, with its plant at New London, Minn., gave the experience of his company with interstate shipments and showed how increased rates had barred it from certain markets. The effect was to make consumers use inferior material. It cost his company \$1.25 per car for coopering and cleaning.

Mr. Robbins was cross-examined more than the preceding witnesses and it was difficult to see the reason for some of the questions that were asked him. One of these was, "Does the price of sand and gravel in Minneapolis have any relation to the price in New York?" Mr. Robbins replied that it did not. He was also asked if there was any relation between the plant costs of sand and gravel and crushed stone. He replied that these could not be compared as working conditions were different. A third ques-

tion was if there was more competition between stone and gravel than between stone and sand. He answered that there was.

A. N. McQuown of the Empire-Wichita Sand and Gravel Co. was next examined. His company has plants on the Arkansas river producing 30 cars per day. Formerly he was able to make interstate shipments but the increases in interstate rates barred him from them today. Points in Oklahoma and Missouri can ship into his market and he cannot compete. His plants have every facility for loading and handling cars.

Increase in Rates Would Bring Chaos

Edwin T. Winkler, traffic manager for the Stewart Sand Co., Kansas City, Mo., testified as to conditions in that city. His company's plants are most of them across the Kansas line. All the companies have particular rates covering sand into Kansas City, Mo., from plants in Kansas. The situation in Kansas City is peculiar as many of the plants are in the switching limits and their rate will not be affected by the proposed increase. Others are just outside the limit and the rate from these will be increased as much as 15%. Mr. Winkler introduced a map to show the location of the plants in and around Kansas City and the railroads over which they ship. Any change in rates would produce a situation which Mr. Winkler said would be chaotic. Switching rates are now so high that any increase in rates would divert business to other methods of transportation. The average haul in the whole Kansas City district is 9.6 miles, and 75% of the total sales are in Kansas City. All but one of the plants in this district make interstate shipments.

A. M. Chandler, of Tulsa, Okla., testified that 90% of his company's business was interstate and that the average haul was 55 miles. There are nine plants in Tulsa and 30 at other points serving a scattered market and any increase in rates would tend to increase the number of plants in a district in which there are already too many. The Arkansas river crosses the state and makes it easy to put in plants. He has 42 competitors now for the same business for which he formerly had only eight.

In the cross-examination he said that he believed both interstate and intrastate rates are too high and also that sand and gravel shipments are materially less than they were in 1921, when he went into the business.

Really a 12 to 16% Increase

G. W. Thompson, traffic manager for the Missouri Portland Cement Co., was the last witness to testify. His company produces sand and gravel at Memphis, Tenn., and St. Louis, Mo., and his testimony had largely to do with the situation in St. Louis. The Missouri Portland Cement Co. will be affected more than some other companies by an increase in rates as it ships in some of its raw material by rail. As regards sand and gravel, Mr. Thompson showed that an increase in rates would bring about a

very unsatisfactory situation. The proposed 7½-cent increase in some cases would mean an increase of 12% to 16%.

He spoke of competition from quarries which bring in the product by truck and said that this competition would be greatly favored if rates were increased. It cost his company from 50 to 60 cents a car for coopering.

The impression left on the completion of the hearing was that Mr. Dow's witnesses had made a strong case. It was expected that the crushed stone interests would present their case later in the week.

Rate Increase Unjust

AT the recent hearing held at Kansas City, Mo., on the proposal to increase freight rates in the Western territory, R. F. Campbell, superintendent of state highways, the Missouri Highway Commission, testified that the increases proposed in Ex Parte 87, if applied, would cut down the state's road-building operations. He said there was only so much to be spent on roads each year. The increase, he testified, would cost the state road-building department \$204,934, or sufficient to build 52 miles of gravel road. He said he thought the carriers were amply paid for the service performed, but, if the commission should decide to allow the increase, it would be preferable to the interests he represented to have the straight 5% increase rather than 7½ cents a ton.

At the hearing before Examiner Keeler, B. L. Glover, general traffic manager of the Iola Cement Mills Traffic Association, Kansas City, entered exhibits and testimony to show that the level of rates on cement in the Western territory was already high. He made comparisons between the scales of rates to I, II, and III territory, as resulting from the decisions of the commission, with the scales as made up by Dr. Lorenz, of the commission's statistical bureau, after presentation of evidence in the cement cases. He pointed out that transportation conditions were similar in scale II and III territory, though the rates for the latter were higher, and also that the scales as adopted were higher than those of the Lorenz scale.

It was his contention that such conditions resulted in irregularities of adjustment on cement in Iowa, Missouri, Nebraska, Kansas, and South Dakota, and that the increases now proposed by the carriers would work a greater hardship than ever on the industry in the West.

E. S. Gubernator, traffic manager of the Lehigh Portland Cement Co., Chicago, gave testimony with regard to cement rates in Illinois territory. It was his point that rates in Illinois had generally been made as a part of C. F. A. adjustments and that the cement rates within the state should not be increased in making readjustments in W. T. L. territory. He said the effect of an increase in the cement rates in Illinois under the present proceeding would be to place the whole state on a level higher than that of surrounding territory.—*Traffic World*.

Montreal Meeting of the National Crushed Stone Association

About 400 Members Hear Accomplishments of the Past Year and Outlook for the Present Year

OUTSTANDING points in the presidential address of Otho M. Graves to the members and guests of the National Crushed Stone Association at Montreal on January 18 were the increase in the active membership of the association from 95 firms to 169 firms at the beginning of this convention. The individual membership has been more than doubled. The reorganization of the association has been successfully accomplished and its future seems assured on lines which have been proved successful by many other trade associations.

The beginning made by the establishment of an engineering or research bureau is, he said, only a beginning in the possibilities opened for service to the users of crushed stone. It will probably be a matter of years before the full value of such service is fully realized, but the foundation of all successful industry today is service to the consumer and accurate scientific knowledge of the product and how it can be used to the best advantage of the public.

Directors Optimistic on Outlook for 1926

The reports of directors on business during 1925 and the outlook for 1926 quite generally verified the analysis and forecast made in Rock Products of December 26. Producers in nearly every section had a fairly satisfactory year in 1925; some, the best business ever; prices it would seem were in general a little lower, but the extra volume of business made up for this. Labor conditions, in general, were excellent and apparently bid fair to remain so, for a time, at least.

Ohio and Indiana—H. E. Bair, director, reporting conditions in Ohio, Indiana and southeastern Michigan in 1925, said labor had been plentiful and well satisfied; the efficiency of operation had increased; car supply and transportation conditions had been more satisfactory than heretofore; an increasing tonnage was being moved by motor truck—about 30% of the product of the 20 quarries of his company now moving by truck to points within 10 to 12 miles of the producing plant. There had been an increasing demand for dolomite and fluxing stone. Conditions resulting from overproduction in Ohio were showing signs of improvement and the

outlook for 1926 was the brightest in two years.

New Jersey—F. W. Schmidt, director, reporting for New Jersey, said that favorable weather conditions permitted his plants to begin production two weeks earlier than usual, but that demand and production decreased as the season advanced. There had been considerable in-



Otho M. Graves

crease in the use of gravel, he said, and that under present highway specifications, freight rates and competitive conditions gravel was getting a constantly growing share of the concrete road aggregate business.

Connecticut—W. Scott Eames, director, reporting for Connecticut, said business had started slowly, but that May and June were good months. Demand slumped somewhat during August, but picked up again later. Railway service had been exceptionally good. Owing to an exceptionally efficient operation prices were appreciably lower than in other sections of the country. He looked forward

to a very prosperous year in 1926; he could see no cloud in the sky except the changes in the income tax laws which may affect the market for municipal, county and state bonds. He thought there was a prospect of a labor shortage.

Illinois—E. J. Krause, director, reporting for southern Illinois and eastern Missouri, said conditions in 1925 had been fairly good; there had been a tremendous increase in the use of agricultural limestone; for the first time in history a market that would absorb all the ¼-in. and smaller stone was in prospect. The outlook for 1926, he said, except for the uncertainties in connection with construction of state highways in Illinois under the \$100,000,000 bond issue, was good.

New York, Pennsylvania, Massachusetts—John Rice, reporting for the territory served by the plants of the General Crushed Stone Co., said that he had enjoyed a more substantial business than usual. Shortages in supply by his own plants had been made good by neighbors in a neighborly way. He saw no cause for concern respecting the outlook for 1926, and believed we were entering a long period of prosperity, so far as road building was concerned, basing his belief on the constantly growing road-building revenues derived from motor-vehicle license fees.

Western New York—W. L. Spurborg, director, reporting for central and western New York, said that business had been reasonably good; the total tonnage produced was ahead of 1924. A rainy summer had set mid-season production back somewhat, but this was compensated for by late season demand. The level of prices had remained about the same as in 1924; some slight reduction in costs had been made possible by greater efficiency. He felt some concern regarding 1926 because he believed general building had caught up with demand; there was also a prospect of labor troubles in the building industry. The outlook for public works was good and he could see a steady, undiminishing demand for stone for road work.

Texas—H. Landa, reporting for Texas, said that so far as his company was concerned, they were facing a year of great prosperity with 100% more orders booked than this time last year.

Ohio—H. H. Brandon, director, said the outstanding event in his territory, speaking generally, was the great improvement in railway service through the efforts of the regional advisory boards composed of railway traffic men and shippers.

Kentucky—R. B. Tyler, director, reported 1925 an off year in his district, partly because the state was in debt and had done little highway work, and partly because most of the roads were in rocky, hilly country where roadside quarries could be made to supply nearly all material required for road construction. The few regularly established plants had to rely almost wholly on railway ballast, and there had been little demand for this in 1925. About the only business the regular plants had was from the towns and cities which had spent some money for public works. Labor had been plentiful and wages reasonable. He said the state highway department would be out of debt in July and the outlook for 1926 was a fair one.

Chicago Territory—Col. O. P. Chamberlain, director, reporting for northern Illinois and the metropolitan district of Chicago, said the plants in this district had operated to about 65% capacity in 1925. Prices had been slightly lower than 1924. Practically all of the plants in the district, he thought, had had profitable business. There had been good co-operation from the railways; the contacts established through the regional advisory boards had proved very helpful. There had been a great increase in the production and sale of agricultural limestone. Road work in 1926 in Illinois was in some doubt because it was not known at this time whether any of the \$100,000,000 bond issue would be available. He thought 1926 was bound to be at least as good as 1925, and possibly better; conditions in the Chicago territory in 1925 were complicated because of the failure of the state road program to materialize, with the result that Chicago became a dumping ground for various aggregate producers.

Western Pennsylvania—P. B. Reinhold, reporting for Pittsburgh and western Pennsylvania, said every producer had experienced a good year, but much of the increased demand was for flux stone. He said 99% of new highway work in his territory was concrete. For rock dusting coal mines as an explosion preventive, he said that the mines in the Pittsburgh district were going largely into the business of pulverizing shale from their own workings. The agricultural limestone business in 1925 was about normal. He said 1926 would be as good a year as 1925. One new thing he believed that could be done by the producers co-operatively was to employ a lawyer to examine contractors' bonds, so that the producer would be protected.

Oklahoma—W. F. Wyse, speaking for Oklahoma, said business was good, trans-

portation perfect, and he anticipated the same conditions in 1926.

Research Program

A. T. Goldbeck, director of the bureau of engineering of the National Crushed Stone Association, gave a remarkably clear and logical analysis of the problems to be met by the crushed stone industry and some of his suggestions for meeting them. He would direct research work toward three major objectives (1) the ultimate development of more business; (2) assist in reducing the cost of production; (3) find an outlet to utilize stone that is now wasted.

Elaborating on the first of these—more economical production—he thought an analysis of costs would help. There is great diversity in costs today, caused by many conditions, perhaps some of them unalterable, but wherever such a diversity does exist, he has always found that there is much to be learned by study and analysis. Some of these cost elements which deserve study, he thought, were size and location of drill holes in blasting, screen standardization, etc.

To make use of crusher waste, such as screenings, he would study the possibilities of concrete products, the use of screenings as fine aggregate for concrete, and for sub-grade treatment under various types of pavement. The development of a secondary type of road, which could be surfaced and maintained with screenings, is a possibility. Little is known of the possibilities of stone dust as a paint filler, for dusting coal mines, etc.

Mr. Goldbeck urged improvement in crushed stone itself. Producers should not be content with present sizing; they should know what sizes are best for special purposes. He said there is a splendid opportunity for co-operation with highway engineers, especially along the line of assistance in the design of road types. Research work which may demonstrate the superiority of crushed stone over other aggregates did not contemplate making attacks upon other aggregates, it was designed merely to see the truth as to the relative merits of various aggregates. Mr. Goldbeck does not believe that present methods of testing aggregates are comprehensive enough; tests for bending, temperature and moisture changes, etc., he said, are more important than compression tests.

Mr. Goldbeck's analysis of the crushed stone industry, and his suggestions for helping it through research work were endorsed by all the former presidents of the association in turn.

John Rice, second president of the association, said the policy outlined was one of exceeding interest; he believed in the service idea; the bureau of engineering must render genuine service to be successful. Mr. Goldbeck, Mr. Rice thought, had already discovered more about the problems of the crushed stone industry than he expected in the short

time available. He said tangible results could not be expected for several years.

E. J. Krause, third president, said he was thoroughly in accord with Mr. Goldbeck's suggestions; he would have patience and see them carried out.

W. Scott Eames, fourth president of the association, said he was impressed with the wisdom of Mr. Goldbeck's suggestions. He had heard many very favorable comments on Mr. Goldbeck's appointment as director of engineering of the association; and to maintain this respect of highway officials scientific and truthful presentation of the work accomplished was of the utmost importance.

F. W. Schmidt, fifth president, said it was the duty of all the members to support the program outlined by Mr. Goldbeck. He said if they wanted "to go faster they would have to dig deeper." He said the association had the right man to direct this work and all should support him whole-heartedly.

Papers and Discussions Later

This is written after the close of the second day's session of the convention, and both days' sessions have lasted until 5 p.m. There is much more to tell about the papers and discussions of these two days; and there are two days' sessions more to come. These we shall have to reserve for our issue of February 6, and in which will be printed in detail all the transactions and business of the convention. Many of the important papers presented will be given in full text.

Expect Business Peak to Be Reached During 1926

DURING the late summer of 1926, the peak of the present era of business prosperity will be reached, is the opinion of Colonel Leonard P. Ayers, vice-president of the Cleveland Trust Co. and nationally known statistician. With respect to the construction industry, Colonel Ayers believes that a new high point will be reached in the spring, and then the curve will take a downward trend. Building costs will remain high—proportionately higher for labor than for materials. The prosperity in all lines of business during 1925 was sustained in no small degree through the activity of the construction industry which in turn was kept going at top speed by three important factors—first, the building shortage which accumulated during the war; second, the tendency of people, in increasing numbers, to leave the more congested districts and build homes in the suburban areas surrounding the great cities; third, a noticeable elevation of the standard of living has resulted in a demand for better housing facilities.

The year will be marked by rising wages, rising cost of living, narrowing profit margins, higher wholesale and retail prices, and a volume of industrial employment coming to a point and turning down.

Sand and Gravel Men Meet in Atlanta

Plans Laid to Make 1926 a Banner Year in the Sand and Gravel Industry

THE National Sand and Gravel Association is holding its Tenth Annual Convention in Atlanta, Ga., as this is written. Though the registration is less than at last year's Chicago convention, the spirit displayed by those present is sure to make up for the lessened numbers. The activities and transactions of the convention will be published in detail in *ROCK PRODUCTS*, February 6.

There are many faces that are seen for the first time at a sand and gravel convention, for the association has grown largely during the past year. It has grown especially among the larger producers of the country who are recognizing the importance of the association in matters which affect the industry as a whole. Some of these matters, such as the standardization of sizes, are expected to be decided at this meeting. It is gratifying to note that a number of producers who are not members are present, as it is thought that many of them will become members before the convention is over.

There is an added interest in the convention because it follows so closely the hearing on a proposed increase in freight rates in the Western territory on sand, gravel, and crushed stone which was heard recently in Kansas City, Mo. It is reported elsewhere in this issue of *ROCK PRODUCTS*. The national association took up the fight not only of its members but of the industry as a whole and expended a large amount of money in preparing the case. It is the opinion of those who heard the evidence that the association has established that rates on sand, gravel, and crushed stone should not be increased, but, on the contrary, they should be lowered. They are already bearing more than their full share of the burden of freight rates.

The first day of the meeting, January 19, has been given to the meeting of the executive committee, President John Prince presiding. As always, the chief feature of this meeting is the report of the executive secretary, T. R. Barrows, which is printed in full below. Besides adopting this report and the report of the treasurer, J. L. Shiely, the meeting discussed the proposed activities of the coming year.

The convention was formally opened by an address of welcome by the Hon. Clifford Walker, governor of Georgia, which was followed by the annual address by John Prince, president of the association for 1925. Mr. Prince reviewed the activities of the past year and predicted an even greater year for the industry to come. The convention

then settled down to the business before it and many interesting papers were heard that are sure to be of great value to all the producers. But pleasure was not entirely neglected, for the entertainment committee in charge of J. L. Shiely and the ladies provided a program that will long be remembered. In fact, the annual dinner held on Wednesday night was declared to be the best ever.

On Thursday morning the last of the re-



Hugh Haddow, Jr., new president of the National Sand and Gravel Association

ports and transactions were heard and the annual elections held. The new officers for 1926 are as follows: Hugh Haddow, Jr., president; R. C. Fletcher, vice-president, and J. L. Shiely, treasurer. Directors at large consist of John Prince, Harry Davison, and J. B. Blanton. The new officers need no introduction, for they are all men who are prominent in the sand and gravel industry and are a most logical choice.

Directors' Meeting

The directors' meeting began at a luncheon held at one o'clock Tuesday. After the members had satisfied their appetites, President Prince opened the meeting with a brief statement of what the meeting was called for. The directors' duties are, at this annual meeting, to form a program of activities for the ensuing year, to prepare a budget and to fix dues in accordance with the necessities of the organization. Nominations of officers are also made here and all these

things are afterward submitted in convention to be approved or rejected by the membership. The directorship of the association consists of one member from each of the 21 districts into which the country is divided and two directors at large.

The report of the executive secretary was accepted without discussion. The report of the treasurer, J. L. Shiely, was also accepted but items formed the basis of discussion of the budget for the ensuing year. President Prince read a statement concerning the work of the association dwelling especially on the past year's growth and the new work that has been undertaken.

In discussing the financial condition he said that the executive committee had had to anticipate dues somewhat in order to start the new engineering and research department, but nevertheless, as the treasurer's statement showed, the association did not owe a dollar, although some \$6000 had been added to the cost of running the association.

He believed that the budget committee might find some difficulty in balancing the budget and in this connection he spoke of the *National Sand and Gravel Bulletin* which showed a loss last year of about \$3000. This opened a discussion as to whether the *Bulletin* should be continued or not. All the directors were asked to express their opinion and without exception they voted that the *Bulletin* should be continued. Hitherto the secretary has accepted only such advertising as come to the *Bulletin* without solicitation. It was voted that the secretary be allowed to solicit advertising so that the *Bulletin* might carry advertising enough to be self-supporting.

The discussion over the fate of the *Bulletin* took up the greater part of the meeting. Other topics discussed were the arrangements made with Stanton Walker, head of the engineering and research department, and the arrangements made with the California producers who have joined the National Association as a group, the Pacific Coast Sand and Gravel Association.

The budget committee consisted of Directors Haddow, Roquemore, Carroll, Shiely, and Fletcher, and the nominating committee of Directors Smith, Schellberg, and Haldiday. These committees were instructed to report at a meeting of the committee to be held Wednesday noon.

Annual Report of Executive Secretary

THERE is nothing to be gained from making a report if it will not be read by those to whom the report is made. There

are two things which discourage the reading of a written document: one is unnecessary length, making it tiresome; the other is a highly elaborated detail, which fails to sustain the interest of the reader.

Keeping in mind the virtue of brevity and conciseness, your executive secretary, in submitting his report of the activities of the

All this is ample evidence of the stability and the progressiveness of the organization. Increased membership and increased revenue have brought about the need of a larger staff and additional office space, this expansion of the association having been made effective on January 1 of this year.

Engineering and Research Division

The National Association has put into full operation its Engineering and Research Division, at the head of which is Stanton Walker, who was connected for many years with the Structural Materials Research Laboratory of Chicago. Mr. Walker is a recognized authority in the art of the proper use of sand and gravel in concrete work, and the experience and training which he brings

the most important activity of the association during 1925, but there is one feature of the major program which is deserving of special mention. That is the work of the Washed Gravel Ballast Committee, composed of members who are numbered among the largest producers of standard ballast in the country. These men have devoted sincere and faithful effort toward bringing about a more appropriate recognition of the economic advantages of washed gravel ballast on the part of the railroads of this country. They have had several meetings with the Ballast Committee of the American Railway Engineering Association, and the final consummation of their work will be a set of specifications which reflect an understanding of sand and gravel deposits and which will promote the economy of production.

With perfect assurance, your executive secretary makes the definite prediction that, through the instrumentality of the Washed Gravel Ballast Committee of the association, there will be an increased demand for gravel ballast and that this demand will appear in 1926.

Co-operation with Federal Specifications Board

Another factor of importance was the co-operation of the association with the Federal Specifications Board, which was charged with the duty of preparing specifications for use by all branches of the government in



R. C. Fletcher, elected vice-president

National Sand and Gravel Association during 1925, has endeavored to confine his remarks to those matters which are of outstanding interest in the affairs of the organization. Therefore, there is no reference in this report to many of the activities in which the association engages daily which partake more of a routine nature and with which the members are already well acquainted.

Solvency and Solid Growth

The National Sand and Gravel Association is an incorporated organization, whose membership is composed of established and responsible sand and gravel producers in all sections of the country. It is a solvent concern, absolutely free from indebtedness of any sort. All revenue derived from the support of its affiliated companies is used to extend and promote the use of properly prepared sand and gravel. There is only one basis for increasing the present membership, and that, briefly stated, is to broaden the scope of the present activities which have proved of such benefit to the sand and gravel producers who have been members of the association since its inception.

During the year 1925 the revenues of the association showed an increase of over 33%. The membership list showed an increase of almost 20%. And the National Association has no field secretary, neither does it search the highways and byways for new members.



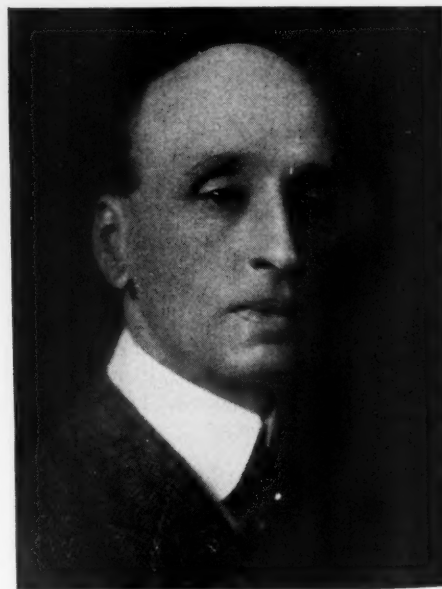
J. L. Shiely, re-elected treasurer

with him will make his services of the utmost value to the established sand and gravel industry.

The Engineering and Research Division will engage in extensive research in behalf of developing and extending the use of properly prepared sand and gravel, and it will provide a special engineering service for member companies. It will also identify itself with professional and technical societies having to do with the construction industry, as well as the maintenance of relationships with various government departments, state highway commissions and county and municipal engineers, with the purpose of placing in the hands of these agencies full information with respect to the value and economy of properly prepared sand and gravel.

Effective Work of Washed Gravel Ballast Committee

It is difficult for one to lay his finger on



T. R. Barrows, executive secretary

the purchasing of commodities which it employs in federal-aid road work and in all general construction work of the government.

The specifications relating to the use of sand and gravel were submitted by the board to the association for criticism and suggestion. A committee of representative members was appointed to consider the specifications and to prepare a report for transmission to the board. Here we have illustrated fore-

ably the need of organized effort in order that the interests of all may be protected, for the board is assured that it will not issue ill-advised specifications for sand and gravel, and the men who are producers of these materials are safe in the knowledge that the National Association has proceeded in such a manner that each of them has shared in a common benefit.

The Western Rate Case

If I may be permitted to cite another instance of the value of co-operative effort, I should like to mention the recent proposal of carriers in western territory to increase all sand, gravel and stone rates by 7½ cents per ton. Faced with the necessity of prompt action to protect themselves against the effect of this unreasonable tax upon the cost of transporting their materials, western producers of sand and gravel called upon the National Association to provide a plan for resisting the efforts of the carriers. Within a very short time, expert attorneys and commerce counsel were busily engaged in the preparation of data and evidence which would support the contention of sand and gravel producers that the proposal of the carriers should be rejected by the Interstate Commerce Commission. A hearing has already been granted by the latter body, when the National Association, as the accredited representative of the sand and gravel industry in the west, forcefully presented the producer's side of the case.

The Valuable Personal Service and Its Interesting Variety

One of the most important activities of the National Association has not as yet been referred to, and that is the personal, individual service which the organization performs only for its member companies. This service covers a multitude of matters and it touches practically every phase of the operations of a sand and gravel plant.

The records reveal that there was a steady demand for this personal service by members throughout the year, and the nature of the service requested was remarkable in its variety. Space does not permit a full description of the manner in which members took advantage of this privilege of membership, but some of the matters which were handled for affiliated companies include the following: lease of government docks and dredges; tests for molding sand; workmen's compensation insurance; car supply; publication of special sand and gravel rates by railroads; information from United States Patent Office; extension of time for filing tax returns; comparative cost of steel and wooden barges; minimum weights of 90% of marked capacity of car; designing of sand and gravel plants; correct accounting practice as to inventory of stocks on hand; right of state commissions to publish special rate for hauling sand and gravel; liability of shippers for uncollected freight charges; information concerning switching rates in all sections of the country; testing of gravel

for concrete highway construction; proportioning of aggregates by weight instead of by volume; depletion of leaseholds; depreciation on floating equipment; winter storage of sand and gravel; cost system for sand and gravel plants; information for use in local advertising campaigns.

There is no end to the variety of these requests and it is apparent that members consider this personal service of distinct value. We have the word of one member who belongs to other trade associations in addition to the National Association that the personal service rendered by this organization is not offered by others, and that he has found it affords him an ample return



John Prince, retiring president of the association

on his investment in the National Association.

Members are urged to take even more advantage of the privileges of the personal service rendered by the National Association, and the executive staff of the organization will give such prompt and complete attention.

Danger of Cancellation of Combination Rule

At frequent intervals in the past your executive secretary has called to the attention of member companies the importance of taking the necessary steps to avoid freight rate increases on their shipments by reason of the cancellation of the so-called combination rule.

As a result of investigations conducted during 1925 by the National Association, involving conferences with officials of the Interstate Commerce Commission, there is no doubt in our mind now that the carriers are redoubling their efforts to do away with the rule.

The plan of action of the various railroad companies seems to be to nibble away at the rule, cancelling it in individual instances, and thus eventually undermining the whole structure in such a way that they will be

enabled to make one great gesture and cancel the combination rule tariff itself, doing away with it altogether.

Your executive secretary is convinced that this is an important question for the sand and gravel industry and that this importance will increase steadily during 1926. It is essential that the following instructions be complied with by those member companies who use the combination rule in their shipments:

First, write the traffic officers of the lines serving your plants, stating that you are opposed to the cancellation of the combination rule and emphasizing that before you will consent to its cancellation, the carriers must publish a full line of through or proportional rates which will reflect the basis theretofore obtained by the application of the combination rule.

Second, make it a plan to watch carefully all reissues of and supplements to tariffs naming rates from your plants. If you discover that the carriers have attempted to cancel the rule without giving you the necessary protection, then request the Interstate Commerce Commission, or your state railroad commission if necessary, to suspend the effective date of the tariff.

May Result in Formal I. C. C. Investigation

It is not improbable that within the very near future the carriers will carry out their intention to eliminate the combination rule on all traffic. In such an event the National Association must immediately take action to protect its members by filing a petition for suspension of the cancellation. We have reason to believe that our petition would be approved and that the commission would thereafter conduct a formal investigation of the effect of the combination rule on sand and gravel movements.

In an investigation of this character, our chances of ultimate success would be measurably strengthened if it can be shown at that time that our members had already gone on record as opposing the cancellation of the combination rule in the manner outlined above. It is for this reason that all companies are urged to comply with our recommendations.

Stabilization of This Industry

In one of the most momentous cases with reference to American industry that has been decided in many years, the United States Supreme Court, in an action involving the legal activities of the Cement Manufacturers' Protective Association, rendered a remarkably clear and comprehensive decision concerning the legal activities of trade associations.

Under the ruling of the Supreme Court in this case, trade associations or combinations of corporations may gather and disseminate information as to the cost of their product, the volume of production, the actual price which the product has brought in past transactions and stocks of merchandise on hand.

They may meet and discuss such information and statistics "without, however, reaching or attempting to reach any agreement or any concerted action with respect to prices or production or restraining competition."

Thus, for the first time, industry knows what the law enjoins them from doing and, likewise, what the law permits them to do. "Free competition," stated the court, "means a free and open market among both buyers and sellers for the sale and distribution of commodities. Competition does not become less free merely because the conduct of commercial operations becomes more intelligent through the free distribution of knowledge of all the essential factors entering into the commercial transaction."

The question of a more fitting stabilization of the established sand and gravel industry is one which is coming rapidly to the front. It is the belief of those who have studied this question that the foundation on which stabilization must rest is accurate and comprehensive cost accounting. No single producer, manifestly, can be successful and serve his customers efficiently unless his operation is reinforced by a complete knowledge of costs. If this is true of a single unit, it is true of a combination of units.

If such an accounting system is placed at the disposal of the established sand and gravel industry; if it is used faithfully and adhered to rigidly by the individual companies; if each established producer comprehends that there can be no stabilization unless the companies which supply materials in common competitive territories gain an understanding of the inexorable law of supply and demand; if everyone learns that there is just so much demand and that overproduction means industrial disorder and consequent prices for their materials which do not compensate them for the cost of production, then we shall have cured a besetting evil in the established sand and gravel industry.

I recommend that appropriation be authorized to cover cost of uniform cost accounting system for members.

Question of Minimum Weights

As a result of the efforts of the National Association during preceding years, a minimum weight for sand and gravel of 90% of marked capacity of car has been authorized by the Trunk Line Association, the Central Freight Association and the Western Trunk Line Committee.

Previous to that time a minimum of marked capacity of car had prevailed, and this was a source of endless annoyance and heavy expense to our member companies. Although the proper authorizations have been issued by the railroad associations named above, it has been discovered that several of the carriers have not amended their tariffs and are still insisting on a minimum loading based on marked capacity of the car.

Several such cases have been handled by

the National Association during 1925, including minimum weights in Southern Territory and also in Illinois, and we have been successful in bringing about the publication of the correct minimum weight. If any member company who now has a marked capacity minimum desires to gain the advantage of a 90% minimum, a communication to that effect should be forwarded to the executive secretary for handling with the interested carriers.

A Recommended Program for 1926

After careful consideration, it is suggested that the following activities be declared as constituting the major program of the National Association during the ensuing year, it being understood, of course, that the regular routine work of the organization, in-



Stanton Walker, head of new engineering and research department

cluding the personal services rendered to the membership, shall be continued as heretofore:

First, the inauguration of a national advertising campaign which will emphasize the economic advantages of properly prepared sand and gravel. It is appropriate to mention at this time that this work has already been started by the National Association in a somewhat limited fashion, and the resources of the organization have been used in aiding local advertising campaigns which have been productive of definite results.

Second, the publication of a brochure, under the supervision of the Engineering and Research Division of the National Association, which will describe in detail the many uses of sand and gravel, the specifications which are observed in these uses and demonstrating the desirability of securing these materials from the established plants.

Third, the institution of the necessary measures by the Engineering and Research

Division for bringing up to date the description of sand and gravel operations and testing which appear in the various engineer's handbooks. The information which is now afforded in such publication does not reflect the modern and scientific conception of the use of sand and gravel.

Fourth, the publication of a pamphlet, under the supervision of H. R. Stutsman, income tax counsel of the National Association, which will furnish our members with authoritative information as to the proper method of setting up depreciation accounts in their income tax returns.

Fifth, the publication of a pamphlet, under the supervision of the commerce counsel of the National Association, which will present a clear picture of the national situation with respect to freight rates on sand and gravel. Such a pamphlet will involve no comparisons of rates on these materials in one section of the country with those in another, but it will be devoted to a citation of the fundamental facts with respect to the transportation of sand and gravel, supported by facts which prove that sand and gravel is exceeded by no other commodity handled by the railroads from the standpoint of desirable, revenue-producing traffic.

Work to Receive Wide Distribution

When the work on these various items have been completed, the results will be published in pamphlet form and given the widest possible distribution. In making these recommendations, your executive secretary has in mind the cordial reception which has met the pamphlet entitled "Depletion: What It Means and 'The Origin of Sand and Gravel,'" which were published and distributed by the National Association in 1925. We have had numerous requests for copies of these reports, including state highway commissions, public libraries, colleges, high schools, scientific bodies and other agencies with whom it is desirable to maintain a contact.

A Feeling of Obligation

With the largest membership list in its history, with a record of solvency, with a wider appreciation of its usefulness to the established sand and gravel industry, the National Sand and Gravel Association, your executive secretary feels justified in reporting, is in a gratifying condition. The outlook for 1926 is promising and the association, aided by the increased support from those engaged in the industry and by the additions to the executive staff, will establish a record of even greater achievement.

Conclusion

In concluding this annual report, your executive secretary desires to give expression to his feeling of obligation for the generous assistance and co-operation which he has received from member companies during the past year, without which the efforts of the organization would have been of no avail.

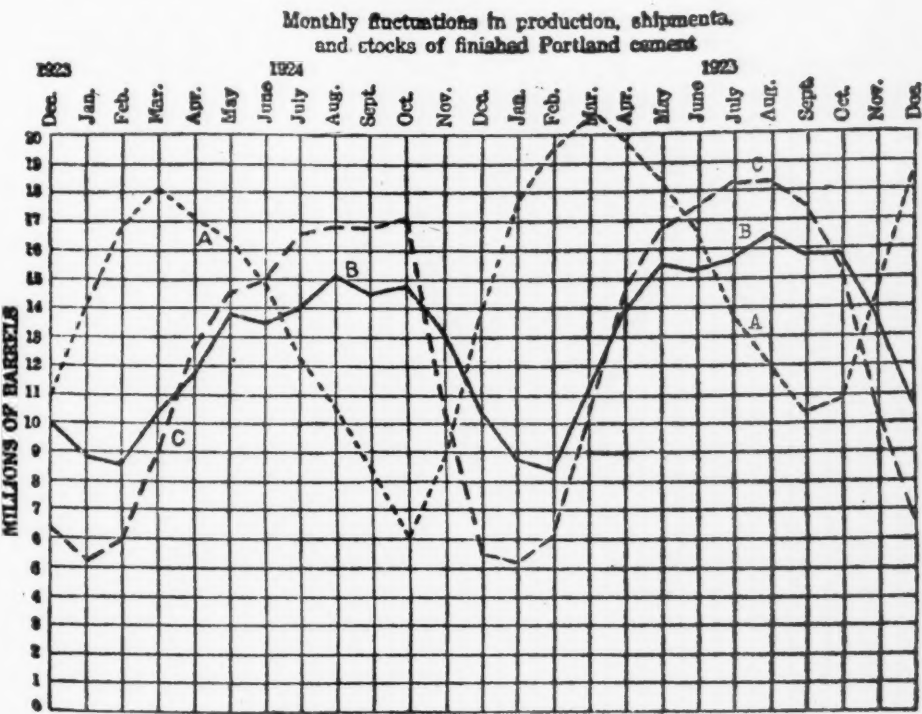
Cement Output for December and for 1925

Summary of Production and Shipments by Districts in 1925

DECEMBER production of portland cement shows an increase of over 3% and shipments an increase of more than 25%, as compared with December, 1924, according to the Bureau of Mines, Department of Commerce. Stocks of portland cement are over 30% greater than at the end of 1924, and the preliminary totals for 1925 show increases of 8% in production and more than 7% in shipments over the final totals for 1924. The following tables prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines are compiled from reports for December, 1925, received direct from all manufacturing plants except two, for which estimates were necessary on account of lack of returns.

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during October and November, 1924 and 1925, and the production, shipments, and stocks of the finished portland cement by months (see following page).



(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES, IN OCTOBER AND NOVEMBER, 1924 AND 1925, IN BARRELS*

Shipped	October		November		Shipped	October		November	
	1924	1925	1924	1925		1924	1925	1924	1925
Alabama	197,661	158,310	189,796	161,142	New Hampshire	42,073	52,975	27,402	35,808
Alaska	437	528	231	132	New Jersey	774,400	847,301	463,036	566,337
Arizona	44,385	33,577	43,541	36,310	New Mexico	13,848	115,687	11,492	16,735
Arkansas	119,926	52,339	87,735	43,423	New York	1,971,186	1,880,822	1,230,384	1,249,902
California	983,747	1,125,094	847,700	972,874	North Carolina	326,870	328,705	255,535	200,447
Colorado	164,675	103,024	89,116	61,541	North Dakota	15,796	28,020	2,876	9,531
Connecticut	182,135	230,906	114,986	148,990	Ohio	1,255,408	870,645	646,386	545,452
Delaware	47,713	63,752	31,546	24,504	Oklahoma	207,750	212,696	187,776	226,437
District of Columbia	78,597	94,295	62,633	106,642	Oregon	112,073	155,066	68,474	73,583
Florida	184,982	535,817	220,005	251,285	Pennsylvania	1,813,998	1,490,931	945,003	945,344
Georgia	137,133	134,198	148,597	104,559	Porto Rico	1,000	0	500	577
Hawaii	2,736	8,086	835	8,410	Rhode Island	80,138	84,229	44,833	50,609
Idaho	29,721	21,228	11,300	19,245	South Carolina	42,076	69,548	57,325	69,234
Illinois	1,586,058	1,257,184	865,928	817,588	South Dakota	67,413	41,532	15,263	14,080
Indiana	653,557	476,635	267,367	233,595	Tennessee	187,410	118,768	140,872	104,657
Iowa	401,177	259,971	129,877	96,762	Texas	357,878	1,290,946	314,451	280,852
Kansas	288,005	215,258	172,934	172,945	Utah	39,420	40,238	17,579	24,607
Kentucky	253,180	139,790	153,650	99,170	Vermont	30,376	31,509	12,923	9,301
Louisiana	112,263	77,948	104,021	75,513	Virginia	178,013	156,782	144,604	104,185
Maine	42,897	40,243	20,649	17,453	Washington	154,515	254,164	91,356	106,111
Maryland	243,639	196,739	180,594	140,656	West Virginia	187,214	193,757	114,229	80,179
Massachusetts	385,297	349,702	265,416	258,733	Wisconsin	556,838	285,712	192,256	173,988
Michigan	1,217,809	992,423	582,371	537,713	Wyoming	32,900	16,522	12,484	9,403
Minnesota	335,139	137,854	136,398	168,138	Unspecified	45,338	36,326	17,199	29,247
Mississippi	59,230	41,777	39,553	53,244					
Missouri	593,899	505,730	362,170	478,531					
Montana	19,682	19,205	8,974	13,819					
Nebraska	226,786	193,568	83,880	82,528					
Nevada	10,010	10,048	7,378	5,751					
					Foreign countries	17,096,407	15,217,110	10,243,419	10,117,802
					plants	63,593	91,890	45,581	69,198
					Total shipped from cement	17,160,000	15,309,000	10,289,000	10,187,000

*Includes estimated distribution of shipments from three plants each month. †Revised.

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN NOVEMBER, 1925*

	Barrels	Value
Alaska	561	\$1,989
Hawaii	3,063	6,804
Porto Rico	2,520	5,806
	6,144	\$14,599

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision. †Imports and exports in December, 1925, not available.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1924 AND 1925

Month	Imports 1924		Imports 1925		Exports 1924		Exports 1925	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
January	153,839	\$250,799	229,838	\$361,098	88,586	\$252,497	71,596	\$207,547
February	162,930	219,588	119,077	206,308	62,606	194,110	56,249	181,356
March	160,517	254,745	218,054	374,839	91,224	254,687	65,248	200,410
April	148,137	227,300	197,686	280,826	83,200	229,183	89,508	263,831
May	161,304	232,950	186,897	286,959	88,850	262,290	85,385	250,845
June	196,655	283,112	254,937	409,539	74,064	229,852	71,343	217,899
July	108,944	181,111	335,118	499,602	60,139	186,073	98,141	286,543
August	192,634	305,690	380,568	611,551	85,883	251,904	103,961	289,904
September	138,369	232,991	513,258	789,152	69,470	206,921	102,649	285,225
October	214,987	337,199	535,092	824,421	79,180	253,479	73,369	228,467
November	198,806	305,598	388,604	678,518	42,490	130,519	101,825	294,201
December	173,814	285,481	(†)	(†)	52,851	163,639	(†)	(†)
	2,010,936	\$3,116,564			878,543	\$2,615,154		

IMPORTS AND EXPORTS* IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES, AND BY DISTRICTS, IN NOVEMBER, 1925

Imported from—	District into which imported—	Barrels	Value
Belgium.....	Florida.....	22,775	\$31,885
	Massachusetts.....	28,590	41,179
	New Orleans.....	8,561	15,977
	Philadelphia.....	36,257	53,445
	Porto Rico.....	107	130
	San Francisco.....	10,932	14,774
	South Carolina.....	25,843	36,283
	Washington.....	19,237	36,990
	Total.....	152,302	\$230,663
British West Indies.....	Florida.....	107	\$275
Canada.....	Buffalo.....	1,793	\$2,751
	Florida.....	62,482	103,817
	Saint Lawrence.....	74,808	122,689
	Vermont.....	608	860
	Total.....	139,691	\$230,117
Denmark.....	Florida.....	5,957	\$32,250
	Porto Rico.....	12,487	20,413
	Total.....	18,444	\$52,663
France.....	New York.....	554	\$936
Germany.....	New Orleans.....	3,431	\$2,975
Japan.....	Hawaii.....	560	\$723
Kwantung.....	San Francisco.....	30	\$35
Norway.....	Florida.....	57,180	\$132,680
	Massachusetts.....	14,625	24,133
	Total.....	71,805	\$156,813
United Kingdom.....	New Orleans.....	1,644	\$3,240
	Oregon.....	3	76
	Porto Rico.....	36	76
	Total.....	1,680	\$3,318
	Grand total.....	388,604	\$678,518

Clinker Stocks

Stocks of clinker, or unground cement, at the mills at the end of December, 1925, amounted to about 6,327,000 bbl. compared with 5,013,000 bbl. (revised) at the beginning of the month.

An estimate of the unground clinker by months is given below.

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1924 AND 1925, IN BARRELS

Month	1924	1925
January.....	5,458,000	7,017,000
February.....	6,905,000	8,497,000
March.....	8,271,000	9,962,000
April.....	8,545,000	9,731,000
May.....	8,225,000	9,053,000
June.....	7,609,000	7,937,000
July.....	6,646,000	6,961,000
August.....	5,367,000	5,640,000
September.....	4,260,000	4,561,000
October.....	3,548,000	4,086,000
November.....	4,025,000	*5,013,000
December.....	5,433,000	6,327,000

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN NOVEMBER, 1925

Exported to—	Barrels	Value
Canada.....	1,165	\$5,050
Central America.....	11,914	31,694
Cuba.....	40,801	97,440
Other West Indies.....	10,846	25,119
Mexico.....	8,445	25,147
South America.....	24,911	87,079
Other countries.....	3,743	22,672
	101,825	\$294,201

SUMMARY OF ESTIMATES OF PRODUCTION AND SHIPMENTS OF FINISHED PORTLAND CEMENT IN 1925, BY DISTRICTS

(In thousands of barrels)

PRODUCTION

Commercial district	Jan.*	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.*	Dec.	1925	1924
Eastern Penn., N. J. & Md.....	2,267	2,486	3,054	3,337	3,660	3,554	3,703	3,726	3,685	3,851	3,457	3,053	39,833	38,657
New York.....	533	272	484	731	838	809	838	867	910	916	872	710	8,780	7,572
Ohio, Western Penn. & W. Va.....	764	593	816	1,275	1,540	1,587	1,618	1,810	1,620	1,700	1,241	955	15,519	14,331
Michigan.....	208	453	566	868	1,120	1,140	1,223	1,192	1,087	1,171	988	904	10,920	9,260
Wis., Ill., Ind. & Ky.....	1,572	1,240	1,406	1,957	2,400	2,441	2,249	2,425	2,403	2,339	1,941	1,295	23,668	21,823
Va., Tenn., Ala. & Ga.....	967	919	1,064	1,111	1,162	1,176	1,230	1,302	1,289	1,254	1,192	942	13,608	11,411
Eastern Mo., Ia., Minn. & S. Dak.†	711	499	887	1,347	1,552	1,461	1,444	1,632	1,591	1,515	1,220	817	14,676	14,823
Western Mo., Neb., Kan. & Okla.†	315	388	867	1,063	1,130	1,147	1,110	1,170	1,122	992	859	512	10,675	9,893
Texas.....	304	339	422	405	392	389	454	481	399	429	399	393	4,806	4,566
Colo. & Utah.....	80	141	101	224	265	216	246	210	215	212	65	33	2,008	2,424
California.....	1,059	733	1,128	1,096	1,067	1,073	1,122	1,181	1,223	1,189	1,099	971	12,941	11,615
Ore., Wash. & Mont.....	76	192	239	393	377	394	404	423	395	424	323	224	3,864	2,983
	8,856	8,255	11,034	13,807	15,503	15,387	15,641	16,419	15,939	15,992	13,656	10,809	161,298	149,358

SHIPMENTS

Commercial district	Jan.*	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.*	Dec.	1925	1924
Eastern Penn., N. J. & Md.....	1,006	1,490	2,758	3,808	4,125	4,340	4,564	4,402	4,428	4,108	2,909	1,908	39,846	37,989
New York.....	148	206	445	771	907	986	1,045	1,001	1,072	977	609	352	8,519	7,436
Ohio, Western Penn. & W. Va.....	346	404	776	1,276	1,590	1,839	1,754	1,905	1,905	1,432	852	545	14,624	14,029
Michigan.....	191	254	428	865	1,201	1,320	1,322	1,285	1,245	1,062	585	309	10,067	8,991
Wis., Ill., Ind. & Ky.....	705	601	1,214	2,140	2,586	2,553	2,743	2,914	2,697	2,014	1,211	629	22,007	21,344
Va., Tenn., Ala. & Ga.....	706	780	1,048	1,134	1,233	1,369	1,375	1,263	1,341	1,236	754	813	13,052	11,374
Eastern Mo., Ia., Minn. & S. Dak.†	332	389	864	1,316	1,714	1,720	1,846	1,952	1,781	1,434	769	357	14,474	13,984
Western Mo., Neb., Kan. & Okla.†	220	468	803	1,029	1,169	1,095	1,187	1,268	1,055	972	818	438	10,522	9,587
Texas.....	280	374	422	451	429	444	463	452	372	335	356	342	4,720	4,488
Colo. & Utah.....	55	110	168	217	227	221	208	230	211	179	113	77	2,016	2,378
California.....	1,029	786	1,082	1,090	1,130	1,123	1,139	1,234	1,199	1,201	1,029	1,016	13,058	11,482
Ore., Wash. & Mont.....	144	153	271	297	424	491	485	477	405	359	182	128	3,816	2,966
	5,162	6,015	10,279	14,394	16,735	17,501	18,131	18,383	17,711	15,309	10,187	6,914	156,721	146,048

*Revised. †Began producing and shipping June, 1924. ‡Began producing December, 1924.

SUMMARY OF ESTIMATES OF STOCKS OF PORTLAND CEMENT AT END OF EACH MONTH IN 1925, BY DISTRICTS

(In thousands of barrels)

STOCKS OF FINISHED CEMENT

Commercial district—	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.*
Eastern Penn., N. J. & Md.....	3,749	4,746	5,042	4,571	4,106	3,321	2,460	1,784	1,048	802	1,353	2,498
New York.....	1,167	1,233	1,272	1,232	1,164	985	757	623	465	411	670	1,028
Ohio, Western Penn. & W. Va.....	1,788	1,977	2,017	2,017	1,966	1,735	1,612	1,517	1,232	1,515	1,904	2,314
Michigan.....	987	1,161	1,323	1,326	1,245	1,065	967	873	716	815	1,318	1,913
Wis., Ill., Ind. & Ky.....	2,908	3,547	3,739	3,555	3,218	3,106	2,611	2,122	1,828	2,153	2,882	3,548
Va., Tenn., Ala. & Ga.....	730	689	706	683	611	410	264	314	271	283	722	851
Eastern Mo., Ia., Minn. & S. Dak.....	3,138	3,248	3,271	3,300	3,067	2,808	2,399	2,080	1,890	1,970	2,422	2,882
Western Mo., Neb., Kan. & Okla.....	1,577	1,498	1,562	1,596	1,558	1,615	1,529	1,430	1,498	1,518	1,559	1,633
Texas.....	378	343	342	294	258	241	232	262	288	382	426	476
Colo. & Utah.....	341	372	306	312	350	343	382	362	366	398	349	306
California.....	525	468	514	520	473	451	435	391	451	458	529	484
Ore., Wash. & Mont.....	368	407	375	471	424	329	248	194	194	274	400	496
	17,656	19,689	20,469	19,877	18,440	16,409	13,896	11,952	10,247	10,979	14,534	18,429

*Subject to revision.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1924 AND 1925, IN BARRELS

Month	Production		Shipments		Stocks at end of month	
	1924	1925	1924	1925	1924	1925
January	8,788,000	8,856,000	5,210,000	5,162,000	14,155,000	17,656,000
February	8,588,000	8,255,000	5,933,000	6,015,000	16,815,000	19,689,000
March	10,370,000	11,034,000	8,995,000	10,279,000	18,189,000	20,469,000
First Quarter	27,746,000	28,145,000	20,138,000	21,456,000		
April	11,726,000	13,807,000	12,771,000	14,394,000	17,159,000	19,877,000
May	13,777,000	15,503,000	14,551,000	16,735,000	16,403,000	18,440,000
June	13,538,000	15,387,000	15,036,000	17,501,000	14,903,000	16,409,000
Second Quarter	39,041,000	44,697,000	42,358,000	48,630,000		
July	14,029,000	15,641,000	16,614,000	18,131,000	12,319,000	13,896,000
August	15,128,000	16,419,000	16,855,000	18,383,000	10,666,000	11,952,000
September	14,519,000	15,939,000	16,827,000	17,711,000	8,404,000	10,247,000
Third Quarter	43,676,000	47,999,000	50,296,000	54,225,000		
October	14,820,000	15,992,000	17,160,000	15,309,000	6,073,000	10,979,000
November	13,141,000	*13,656,000	10,289,000	*10,187,000	8,928,000	*14,534,000
December	10,435,000	10,809,000	5,506,000	6,914,000	*14,123,000	18,429,000
Fourth Quarter	38,396,000	40,457,000	32,955,000	32,410,000		
Preliminary Total	148,859,000	161,298,000	145,747,000	156,721,000		
Amount of under-estimate	499,000		301,000			
Final Total	149,358,000		146,048,000			
*Revised.						

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN DECEMBER, 1924 AND 1925, AND STOCKS IN NOVEMBER, 1925, IN BARRELS

Commercial District	Production—December		Shipments—December		Stocks at end of December		Stocks at end of November, 1925*
	1924	1925	1924	1925	1924	1925	
Eastern Pa., N. J., & Md.	2,883,000	3,053,000	1,606,000	1,908,000	2,545,000	2,498,000	1,353,000
New York	565,000	710,000	283,000	352,000	789,000	1,028,000	670,000
Ohio, Western Pa., & W. Va.	898,000	955,000	346,000	545,000	1,370,000	2,314,000	1,904,000
Mich.	491,000	904,000	182,000	309,000	1,051,000	1,913,000	1,318,000
Wis., Ill., Ind. & Ky.	1,519,000	1,295,000	527,000	629,000	2,051,000	3,548,000	2,882,000
Va., Tenn., Ala. & Ga.	947,000	942,000	792,000	813,000	494,000	851,000	722,000
Eastern Mo., Iowa, Minn. & S. Dak.	953,000	817,000	263,000	357,000	2,744,000	2,882,000	2,422,000
Western Mo., Nebr., Kans. & Okla.	705,000	512,000	315,000	438,000	1,469,000	1,633,000	1,559,000
Texas	372,000	393,000	258,000	342,000	356,000	476,000	426,000
Colo. & Utah	138,000	33,000	63,000	77,000	316,000	306,000	349,000
Calif.	879,000	971,000	774,000	1,016,000	503,000	484,000	529,000
Ore., Wash. & Mont.	85,000	224,000	97,000	128,000	435,000	496,000	400,000
	10,435,000	10,809,000	5,506,000	6,914,000	14,123,000	18,429,000	14,534,000
*Revised. †Began producing and shipping June, 1924. ‡Began producing December, 1924.							

Oregon Cement Plants Prosper in 1925

THE cement industry in Oregon found 1925 a prosperous year, with all the manufacturing plants running full blast, according to statements issued by officials of the three Oregon companies. The total production for the state was between 1,200,000 and 1,300,000 bbl.

Oregon has three cement plants, the Oregon Portland Cement Co.'s plant at Oswego, the Beaver Portland Cement Co.'s Gold Hill plant, and the Sun Portland Cement Co.'s plant at Lime, near Huntington.

The new bridges in Portland were said to have contributed largely to the industry's prosperity. The Burnside bridge required about 80,000 bbl. of cement, the Sellwood bridge about 14,000 bbl., and the Ross Island bridge about 50,000 bbl.

As a result of this demand, added to the normal needs of the state, the cement industry for each month of 1925 showed an increase over the corresponding month of 1924. Reinforced concrete buildings also showed a gain in popularity over steel and other forms of construction, it was said. Much of the cement was used to make pave-

ment for road and street work, and for constructing culverts.

The Oregon Portland company found its market chiefly in Portland, and the Willamette valley, with some buyers on the coast, and in eastern Oregon. Clackamas county also took a big quantity.

The Sun Portland company marketed its product principally in Idaho, and in eastern, central and western Oregon. The company reported marked increase in sales, good markets being found for the product of its new \$1,000,000 plant at Lime, which began operation in January, 1923. Portland was one of its principal buyers for the year.

The Beaver company sold some cement in Portland, disposed of large quantities in northern California, and shipped some east. One of its biggest sales during the year was to the California-Oregon Power Co., at Thrall, Calif., where 40,000 bbl. were disposed of in one lot. Good business was maintained also with cement dealers.

Each of the three plants employs about 100 men. The Sun and Beaver plants reported output of about 400,000 bbl. each during 1925, while the Oregon company estimated its output at between 400,000 and 500,000 bbl. for the year.—*Portland (Ore.) Oregonian.*

Missouri Portland to Erect a Cement Plant in Arkansas

DEVELOPMENT of the vast limestone deposits in the northwestern section of Independence county, Arkansas, and establishment of the largest cement plant in the South has been practically assured for this year. The Missouri Portland Cement Co. of St. Louis, through the Batesville Cement Co., has obtained leases on more than 1000 acres rich in limestone deposits near Batesville, Ark., and between Danieville and Earnheart on the Missouri Pacific railroad.

The company has opened offices in the First National Bank building in Batesville and employed engineers who are making tests to decide the extent of the clay shale on their holdings. The tests so far are satisfactory. Construction work will start soon upon a large scale.

It is said that plans call for the erection of a \$1,000,000 cement plant in the locality. The company owns and operates a three-kiln wet-process cement plant at St. Louis and a dry-process plant at Kansas City, Mo. Plans are said to have been made by the Missouri Pacific railroad for the construction of additional trackage and spurs to the development project.—*Little Rock (Ark.) Gazette.*

Canada Cement Company President Predicts Lower Prices

FRANK P. JONES, president of the Canada Cement Co., Ltd., Montreal, Que., who has just returned from a trip to Florida, has made the following comment on the outlook for prices: "My policy for years has been to get the price of cement down totally regardless of whether there is competition or not. We have made many reductions in the past and made a substantial cut last year. There will likely be another in the spring. As we get our costs down we can afford to sell more cheaply. Cement is already cheaper in Canada than anywhere else in the world and it will be cheaper than it is now. It will be the cheapest of all building materials and it will consequently grow in popular favor. Business in Canada was not particularly good in 1925 but our low price enabled us to build up a substantial export business, in fact, 30% of the cement made in the province of Quebec was exported out of Canada."

The Canada Cement Co. in the past year has exported a large amount of cement into Florida.

Atlas Puts New Kiln in Operation at Leeds, Alabama Plant

THE new kiln at the Leeds, Ala., plant of the Atlas Portland Cement Co. was placed in operation recently.

This gives the plant four kilns and increases annual production more than 200,000 bbl.

Southwestern Portland to Add Fifth Unit to Victorville, California, Plant

INIITIATORY work for the construction of the new unit at the Victorville, Calif., plant of the Southwestern Portland Cement Co. of Los Angeles, Calif., is under way. This will make five units and largely increase the capacity of the plant, now unable to supply the enormous demand for its product.

In addition to this enlargement of the already modern and extensive plant it has been found necessary to provide additional facilities for bringing the raw material, calcite or limestone, from the quarries and to open larger quarries. With this in view, the company has acquired additional and extensive deposits of the limerock suitable for its purpose and is preparing to extend its railway line some miles to the north and east. The company has already in operation seven miles of railway to its quarries now being operated.

The railway will be constructed by the Victor Railway Co., a corporation organized by Los Angeles business men with a capital of \$200,000. The corporation has been granted a franchise by the state to construct the line, and a condemnation complaint states and lists 12 property owners as defendants across whose lands a right-of-way is requested.

The Southwestern Portland Cement Co. is one of the largest producers in the country and operates in addition to the Victorville, Calif., plant, plants at El Paso, Texas, and Osborn, Ohio. (The latter was described in detail in *ROCK PRODUCTS*, September 19 issue.)—*Victorville (Calif.) News*.

Universal Portland Establishes Safety Record

ALL safety records during its quarter of a century's history were broken last year by the Universal Portland Cement Co., Chicago, Ill., operating plants at Buffington, Ind., Universal, Penn., and Duluth, Minn., according to the statement of B. F. Affleck, president of the company.

"While production greatly increased during the last 25 years, the accident rate has steadily declined until last year it was only a fraction of 1% in relation to the total number of persons employed," he reported. "In our plant at Duluth, for example, the whole year passed without having an hour's time lost on account of accidents. Our plants in other cities produced similarly good results.

"During the month of December just finished a 100% safety record was achieved at all our plants, no time being lost anywhere because of accidents. The significance of this record is revealed when one recalls that thousands of men are employed day and night operating burning, crushing, and grind-

ing machinery, elevators, conveyors, cranes, packing machines and electrical apparatus required in making some 60,000,000 sacks of cement in a year."—*New York Journal of Commerce*.

Canada Cement Company to Re-open Hull Plant

ADISPATCH from Ottawa tells of a report there that the Canada Cement Co., Montreal, Que., intends opening up its plant at Hull, Que., which has not been in operation for the past five years. This report comes in substantiation of reports that have been rumored for some time and which were officially confirmed recently. It is understood that the reopening of the Hull plant has been made advisable owing to plans for industrial expansion in that section of the country, notably the development of the old Riordon properties by the International Paper Co., and plans for further hydro-electric development in the district, which promise a large tonnage for the cement company. It has been rumored that the International Paper development alone will call for about \$1,000,000 worth of cement. The Hull plant is obviously in the best location to supply this demand, and its being replaced in commission will place the company in a better position the more economically and expeditiously to serve western Quebec and eastern Ontario.

U. S. Gypsum Co. Expanding Its Lime Business

AS announced in our December 26 issue, p. 193, the U. S. Gypsum Co. has purchased limestone quarry property at North Canaan, Conn., with the intention of building a new lime plant. However, we are officially informed that the company has no immediate intention of developing this property.

The company is, however, greatly increasing the capacity of its Ohio finishing lime plant at Genoa through the installation of two 8x150-ft. rotary kilns, the object of the rotary kiln installation being largely to utilize much of the fines that are now wasted or sold as crushed stone.

Gas Producers Used at Newest Lime Plants

GAS PRODUCERS for new lime-kilns are being installed in conjunction with two 8x150 ft. rotary kilns at the Genoa, Ohio, plant of the U. S. Gypsum Co., the 9x175-ft. rotary kiln for the Bellefonte, Penn., plant of the American Lime and Stone Co., and the big new shaft kiln of the Peerless White Lime Co., Ste. Genevieve, Mo. The gas producers to be used at these plants are all what are known as "Heavy Duty" producers made by R. D. Wood and Co., Philadelphia.

St. Louis Opens Bids for Lime for Water Purification

BIDS for 17,000 tons of lime for use in water purification were recently opened by the city of St. Louis, Mo. The low bid was \$6.78 per ton, by the Mississippi Lime and Material Co. of Alton, Ill. The present contract in force calls for a price of \$8.15 per ton.

Other bids were by the Glencoe Lime and Cement Co., present contract holder, \$7.07; Hunkins-Willis Lime and Cement Co., \$7.39; St. Genevieve Lime Co., \$7.50; Aluminum Corp. of America, \$7.90, and the St. Louis Lime and Cement Co., \$9.

Two years ago lime cost the city between \$11 and \$11.50.—*St. Louis (Mo.) Post-Dispatch*.

Famous Old Granite Quarries Sold

ANNOUNCEMENT has been recently made of the sale of the Port Deposit, Md., granite quarries to a syndicate of New York, Pennsylvania and Maryland business men.

This is thought to be the first move in the actual construction work of the proposed Conowingo dam. J. Wesley McAllister, of Elkton, Md., represented the purchasers and the property was sold by George Schaffer, of Baltimore, Md. The price was not stated.

The Port Deposit quarries were opened in 1789 and from 1806 were operated continuously by the McClenaham family until the outbreak of the World War. Since then they have been worked spasmodically by the present owners. They are the oldest quarries in Maryland, if not in the United States.

It is reported they will be immediately put in working order and be made ready to supply the demand for crushed stone for the dam.—*Elkton (Md.) Democrat*.

State Purchase of Cement Plant at Michigan Authorized

PURCHASE of the state-operated cement plant at Chelsea, Mich., was authorized by the state administrative board recently. Under the terms of an option secured when the plant was taken over the state has been renting for two years at \$75,000 a year with a privilege of buying for \$500,000. The \$150,000 paid in rent will apply on the purchase price.—*Saginaw (Mich.) News-Courier*.

British Columbia Gypsum Company's New Plant in Operation

THE mills of the new plant of the British Columbia Gypsum Co., Ltd., have commenced crushing and the first barge load of material will leave at New Westminster shortly for export. Manufacture of plaster at the gypsum plant will commence early in 1926.

John T. Dyer Quarry Company Purchases Birdsboro Stone Company

THE plant of the Birdsboro Stone Co. located in the Hopewell Hills near Birdsboro, Penn., has been taken over by the John T. Dyer Quarry Co. The Birdsboro



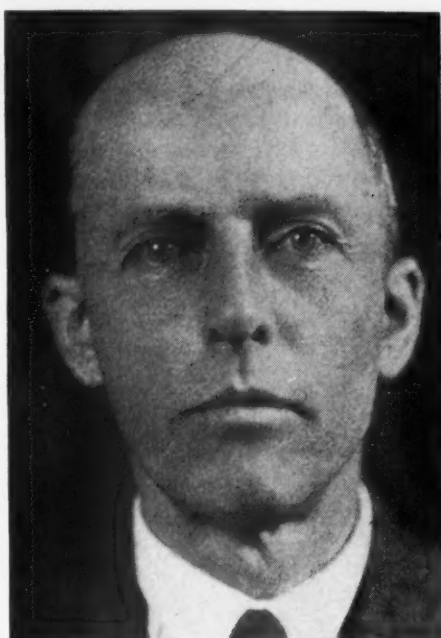
Crushing and screening plant of the Birdsboro Stone Co., near Birdsboro, Penn.

Stone Co. established a trap rock quarry at their present location about 18 years ago. It was started under the ownership of the Bergdolls, of Philadelphia, and later organized as the Birdsboro Stone Co. The company connects their plant by siding with the Pennsylvania railroad at Monocacy and have large storage grounds near the railroad at West Monocacy.

The Birdsboro plant produces about 4000 tons of crushed and washed trap rock per day. A large part of the output is sold to the Pennsylvania railroad for ballast and in the Philadelphia district which is a large consumer of crushed stone and highway materials. The plant and equipment acquired are modern and the quarry operation has been recognized as most efficient. The quarry face has been developed across a hill for

something over 1000 ft. and is about 270 ft. high at the highest part. (A complete description of the plant and operations was published in ROCK PRODUCTS, October 4, 1924.)

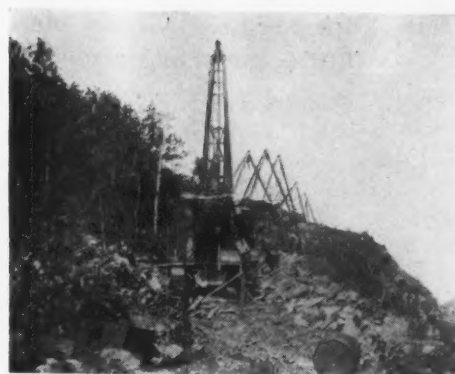
It is the intention of the management of the John T. Dyer Co. to make no changes in the active running of the plant of the Birdsboro Stone Co. All the business of both plants will be actively managed from



F. T. Gucker, secretary-treasurer and general manager of the John T. Dyer Quarry Co.

the office of the John T. Dyer Quarry Co., Norristown, Penn. The Dyer company will continue the operation of their plants at Trap Rock Station, near Birdsboro, and at Robeson Station. For several months the company has been at work installing a large crusher equipment, railroad siding, etc., at Monocacy Hill, but since taking over the Birdsboro Stone Co.'s outfit no further developments at this new location will be made. The Dyer company by this new move becomes one of the largest producers of crushed trap rock in the United States.—*Reading (Pa.) Eagle.*

A recent clipping from the Philadelphia, (Penn.) *Enquirer* reports that the John T. Dyer Quarry Co. has purchased the holdings of the Birdsboro Stone Co. in New Jersey, in addition to the Birdsboro, Penn., property. The price paid for both is said to be close onto \$1,000,000, subject to a mortgage of \$600,000. This is an excellent indication of what well-mangaed and



An 8-in. well drill at the Birdsboro Stone Co. quarry

equipped quarry properties are worth, especially if they are close to a market where there is a strong demand for the product. The trap rock ledges in and around Birdsboro have been worked for crushed stone about as long as any in the United States.

Fire Damages Property of Templeton Limestone Company

FOR the second time within five years fire caused serious damage to the plant of the Templeton Limestone Co., owned principally by Harry R. Gault, of Kittanning, Penn., and located at Templeton, Penn.

According to reports the entire crusher house and equipment were destroyed. This consisted chiefly of the crushing plant, 60x40 ft. and 80 ft. high, in which were located ten large bins and an elevator. The destroyed property is said to represent an investment of about \$50,000. In 1920 the plant was destroyed by fire. It had been completely rebuilt by Mr. Gault since that time.—*Kittanning (Penn.) Times.*

Idaho Marble Company Acquires Holdings of Black Marble and Lime Company

THE Idaho Marble Co. of Lewiston, Idaho, is reported to have acquired the black marble deposits north of Joseph, Ore., from the Black Marble and Lime Co. The Idaho company had a 60-day option on the property and after many tests on the deposits, exercised the right to purchase given them in the document.

The Idaho company works a white marble deposit at Agatha, Idaho, and produces crushed stone, terrazzo chips and other lime products. The plant was recently destroyed by fire but has been entirely rebuilt and is again in operation. The new structure is a four-story affair built of heavy timber. The daily output of crushed stone is estimated at 160 tons per 8-hr. shift. The new plant was designed by A. J. Warren, company engineer, and is managed by H. J. Kressly. The company also works an asbestos deposit near Kanniah, Mont.—*Lewiston (Idaho) Tribune.*



Part of the 270-ft. quarry face at the Birdsboro Stone Co.

New York Sand and Gravel Men Form Association

THE sand and gravel producers of New York state have formed an association and the first meeting was held in Syracuse on January 6. Seventeen of the leading producers of the state were present. The



J. E. Carroll

following were chosen as officers for the ensuing year: J. E. Carroll, president; C. K. Smith, vice-president; John G. Carpenter, secretary-treasurer.

The title of the association is The Empire Sand and Gravel Producers Association, and the office is in the Lincoln Bank building, Rochester, N. Y.

The state has about 100 sand and gravel producers and while the attendance was small a number of producers who were not present have said that they would come to future meetings. The industry represents about \$15,000,000 of invested capital and a genuine interest in organization has been created which is expected to lead to important results.

Heavy Ice Stops Sand Operations in Ohio River

HEAVY running ice in the Ohio river, and ice gorges at some points, stopped all river traffic in the latter part of December, during a zero freeze period, all boats, equipment, sand diggers, etc., being taken into the canals and ice harbors for protection against ice damage. The local sand and

gravel companies have fair stocks of material on yards, and are delivering from yard stocks, production being at a complete standstill.

Southeastern Missouri Gravel Plants in Merger

FIVE sand and gravel plants in the southeast Missouri section have recently been consolidated under the name of the Lutesville Sand and Gravel Co., with a capitalization of \$100,000. The companies combined are the Madison Sand and Gravel Co. of Fredericktown, Mo., which operates a plant

THE Sand-Lime Brick Association will hold its annual convention in New Orleans, La., February 9, 10, and 11, at the St. Charles Hotel. J. Morley Zander, Saginaw, Mich., is president, and G. W. Phelps, Flint, Mich., is secretary. The best convention ever is anticipated.

at Castor, Mo., and another at Whitewater, Mo.; the Taylor-Lutes Gravel Co. of Lutesville, Mo., and the Lutesville Sand and Gravel Co. of Lutesville, Mo.

The Lutesville Sand and Gravel Co. recently filed amendments to their charter increasing their capital from \$40,000 to \$100,000. The additional stock was taken up by H. H. Humphreys and C. L. Whitener, both of Fredericktown, Mo., and the owners of the Madison Sand and Gravel Co., one of the companies entering the merger. It is understood that the Taylor-Lutes company was purchased outright by the company. By this latest consolidation, it is said that control of almost all the sand and gravel deposits in that locality are placed under one management.—*Fredericktown (Mo.) News.*

Certainteed Products Company to Build Wall Board Plant at Acme, Texas

AT the recent meeting of the directors of the Certainteed Products Co. in New York plans were adopted for a wall board plant which will be constructed at Acme, Texas, by the Acme Plaster Mills, a subsidiary corporation. It is stated by C. V. Vestal, superintendent of the company's mills at Acme, that the proposed plant will cost \$500,000 and will give employment to 200 persons. The decision to add a wall board plant to the industry was reached as a result of extensive explorations of the gypsum deposits of this section which were made by the company during the last few months. It was found that the supply of gypsum rock was sufficient to allow operations for a long period.

Gypsum Industries Appoints Henry J. Schweim Chief Engineer

HENRY J. SCHWEIM has been appointed chief engineer of The Gypsum Industries, Chicago, Ill., to succeed the late Virgil G. Marani, who served the industry in that capacity for many years. These men were personal friends and for a long period were engineering associates.



Henry J. Schweim

Mr. Schweim's engineering education was received at Armour Institute of Technology. He was associated with Mundie and Jensen, architects, with the National Fireproofing Co. as chief draftsman and with the United States Gypsum Co. as sales engineer, supervisor of sales, testing engineer and as district manager. During the war he was sent to New York to serve the government in securing supplies of gypsum building products and to act in engineering advisory capacities. Thus his technical training has been backed by a wealth of practical experience.

Thomas Brisch, President Rockwell Lime Company, Dies Suddenly

THOMAS BRISCH, president of the Rockwell Lime Co. of Chicago, Ill., and of the brick company which bears his name, was stricken with a heart attack recently, and died while he was being rushed to the hospital.

Mr. Brisch was 58 years old and is survived by a sister and two brothers.

Besides serving as active head of the lime and brick companies, Mr. Brisch was an officer and director of several banks and manufacturing concerns about Chicago.—*Chicago (Ill.) Herald.*

New York State Quarry Men Meet at Albany

Annual Elections, Changes in By-Laws
—Secretary's Report Shows Great Activity

THE New York State Crushed Stone Association held its regular monthly meeting at Albany, Friday, December 18. The annual election was held at this meeting and A. G. Seitz, of the Rock Cut Stone Co., was elected president for 1926. G. E. Schaefer, of the General Crushed Stone Co., was re-elected secretary and treasurer.

Some changes in the by-laws were made, and there was a long discussion on the cost of electric power for plant operation.

A feature of this meeting was the report by the secretary of the year's activities. The association has no dues and no initiation fees. Expenses were the very moderate sum of \$132.47 for the past two years or about \$1.50 per year per member.

The report gives a summary of the work which had been done by the association in 1925, and after reading it every member was probably convinced that his \$1.50 had been well invested. The summary follows:

Activities of the New York State Crushed Stone Association in 1925

Discussed new legislative bills pertinent to our industry supporting some and opposing others.

Negotiated with insurance companies relative to downward revisions in premiums for workmen's compensation liability.

Watched tariffs for freight rate revisions, and handled in particular the discriminations

by certain carriers in publishing crushed gravel rates on 10 cents per ton lower basis than stone.

Voted in favor of present structure of freight rate establishment and opposed tentative changes to a mileage or zone basis.

Met with other state stone associations relative to standardization of sizes and research work in connection with the use of stone versus gravel in concrete pavement construction.

Met with state and county highway officials to promote a better mutual understanding, insure greater production, better quality of product, uniformity of shipments through-



A. G. Seitz

out the season rather than peak loads in spring and fall; more adequate deliveries.

Assisted National Crushed Stone Association in railroad matters in this state, and before the Interstate Commerce Commission at Washington.

Procured approximately 25 new members for the National Crushed Stone Association.

Contributed our share of new Bureau of Engineering and Research at Washington.

Deplored the action of some state and county penal institutions in selling stone commercially in competition with regular commercial quarries.

Kept in touch with matters vital to our industry, developing same where necessary, and transmitting information to our membership.

Assisted each other on shipments where necessary so that maximum service could be rendered irrespective of which firm order had been originally placed.

Visited and inspected 20 stone quarries and three gravel plants, interchanging ideas for betterment of production methods.

Indiana Crushed Stone Association Holds Annual Meeting

THE fourteenth annual meeting of the Indiana Crushed Stone Association was held recently at Indianapolis, Ind.



E. B. Taylor

Many very enthusiastic discussions were held during the several hours the Indiana operators were in session, and the operators were especially optimistic about the 1926 season confronting them.

The following were elected officers of the association for 1926:

N. E. Kelb, Greencastle, Ind., president; John Collett, Ridgeville, Ind., vice-president; F. W. Connell, Indianapolis, sec'y-treasurer.

E. B. Taylor, Greencastle, Ind., was elected chairman of the executive board, and R. E. Greely, St. Paul, Ind.; E. H. Tielker, Ft. Wayne, Ind.; J. E. Baney, Kentland, Ind., and E. T. Milligan, Muncie, Ind., directors.



George E. Schaefer



F. W. Connell

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning January 20:

Central Freight Association Docket

12213. Stone, dolomite, raw, in bulk in open-top cars. Woodville and Gibsonburg, Ohio, to Cambridge, Ohio. Present, 19½ cents; proposed, \$1.13 per net ton.

12221. Gravel and sand, except blast, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica. Carloads, Columbus, Ohio, to various points in Ohio. Present and proposed rates as follows:

To	From Columbus, Ohio	Proposed rate	Present rate
Pataskala, Ohio60	.70
Newark, Ohio70	.80
Newcomerstown, Ohio90	.....
Uhrichsville, Ohio	1.00	.....
Lancaster, Ohio90	.....
Circleville, Ohio90	.....
Washington C. H., Ohio90	.....
London, Ohio60	.70
S. Charleston, Ohio60	.80
Xenia, Ohio70	.....
Morrow, Ohio80	.....
Cincinnati, Ohio90	.....
Springfield, Ohio70	.90
Dayton, Ohio70	.90
Centerburg, Ohio70	.80
Mt. Vernon, Ohio70	.80
Brink Haven, Ohio80	.....
Killbuck, Ohio90	.....
Orrville, Ohio90	.....
Akron, Ohio	1.00	.....
Marion, Ohio70	.90
Bucyrus, Ohio80	.90
Carrothers, Ohio	1.00	.....
Sandusky, Ohio	1.10	.....
Vernon, Ohio	1.00	.....
Tiffin, Ohio	1.10	.....
Maple Grove, Ohio	1.10	.....
Burgoon, Ohio	1.10	.....
Toledo, Ohio	1.20	.....
Loudonville, Ohio	1.00	.....
Mansfield, Ohio90	1.00
Crestline, Ohio90	1.00
Upper Sandusky, Ohio	1.00	.....
Dunkirk, Ohio	1.10	.....
Lima, Ohio	1.10	.....
Milford Center, Ohio60	.70
Urbana, Ohio70	.90
Piqua, Ohio90	1.00
Woodington, Ohio90	.....

*Sixth class.

12237. Crushed stone. Carloads, Marble Cliff, Ohio, to Ohio points:

Destinations	In cents per 2000 lb.	Present	Proposed
Westerville60	.60
Galena70	.60
Sunbury70	.60
Condit70	.60
Centerburg70	.60
Mt. Liberty
Bangs
Mt. Vernon70	.60
Gambier
Howard80	.70
Danville80	.70
Brink Haven80	.70
Glenmont90	.70
Killbuck70
Millersburg90	.70
Holmesville70
Fredericksburg90	.70
Apple Creek70
East Union
Orrville90	.70
Marshallville
Warwick	1.00	.80
Clinton
Barberton
Akron	1.00	.80
Cuyahoga Falls80
Hudson90
Macedonia
Bedford

12279. Gravel and sand. Ambridge, Baden and Freedom, Penn., to Hecla, Penn. Present rate: 16 cents from Ambridge and 17 cents from Baden and Freedom, Penn.; proposed, \$1.25 per net ton.

12282. Gravel and sand. East Liverpool, Ohio,

to Ellwood City, Penn. Present rate, 11½ cents; proposed, 80 cents per ton of 2000 lb.

12283. Crushed stone. Carloads, Sandusky, Ohio, to Uhrichsville, Ohio. Present rate, \$1.40 per net ton; proposed, \$1.20 per net ton.

12284. Crushed black slag. Carloads, Cincinnati, Ohio, to Franklin, Ohio. Present, 11½ cents; proposed, \$1 per ton, applicable on shipments originating at Copper Hill, Tenn., and shipped in open-top cars.

12285. Crushed stone. Carloads, White Sulphur, Ohio, to Thurston, Ohio, and Hebron and Corning, Ohio. Present, 90 cents per net ton; proposed, 70 cents per net ton to Thurston, Ohio, and 80 cents per net ton to Hebron and Corning, Ohio.

Illinois Freight Association Docket

23A. Sand, silica, blast, engine, foundry, glass or molding. Carloads, minimum weight marked capacity of car. From Bear Creek, Ill., to Gary, Ind., and East Gary, Ind. Present, \$1.76 per net ton; proposed \$2.02 per net ton.

1068A. Gravel, novaculite or gannister. Carloads, minimum weight 60,000 lb. From Elco and Gravel Pit, Ill., to Mexico, Mo. (rates in cents per net ton): Present, \$2.48; proposed, \$1.76.

2778B. Feldspar. Carloads, minimum weight marked capacity of car. From East St. Louis, Ill., when originating at Hill City, S. D., to Murphysboro, Ill. (rates in cents per net ton). Present, \$2.90; proposed, 75 cents.

2779D. Lime. Carloads, minimum weight 30,000 lb. From Mosher and Ste. Genevieve, Mo., to DeKalb, Ill. Present, combination of locals; proposed, 17 cents.

3472. Crib and derrick stone. In open cars, carloads, minimum weight marked capacity of car. From Chasco, Ill., to Joppa, Ill., for delivery direct from cars to government barges. Present, 88 cents per net ton; proposed, 55 cents per net ton.

Western Trunk Line Docket

5063. Granite and marble. From and to Colorado common points and Groups 1 to 7 inclusive, as shown in Items 2685A and 2690 of W. T. L. Tariff 111E, I. C. C. A1498. Present as shown in Items 2685A and 2690 W. T. L. 111E. Proposed description: Hammered, finished, dressed, carved or lettered (not sculptured or statuary), all chiseled, traced, polished, carved or lettered pieces to be in boxes or crates or with finished surfaces protected by boxing or crating securely strapped to each piece. Minimum weight, carloads, 50,000 lb., L. C. L. actual weight.

5073. Sand, gravel, cinders, crushed refuse, gravel, crushed concrete gravel and sand and gravel pit strippings. Carloads. From Beloit and Janesville, Wis., and South Beloit, Ill., to Milwaukee, Wis. Present, 4 cents per 100 lb.; proposed, from South Beloit and Beloit, 4.4 cents per 100 lb.; from Janesville, 4.2 cents per 100 lb. Minimum weight 90% of car, but not less than 40,000 lb.

Trunk Line Association Docket

12941. To increase rate of \$1.10 to \$1.20 per ton of 2000 lb. on crushed stone, carloads, from North Leroy, N. Y., to Hall, Bellona, Berton and Penn Yan, N. Y. Reason for this proposal: To place rate on same basis as now carried by the N. Y. C. R. R. from Leroy, N. Y.

Southern Freight Association Docket

24650. Lime. Carloads, minimum weight as to \$2.65 of the rate (proportion to Cincinnati, Ohio) 20 net tons; as to 72 cents of the rate (proportion beyond Cincinnati, Ohio), minimum weight 25 net tons, from Burns, Tenn., to California, Ohio. No through rates now published. Proposed, \$3.37 per net ton, same as at present applicable from Sherwood, Tenn.

24651. Artificial stone. It is proposed to establish on artificial stone, carloads, subject to present description and minimum weight, from Richmond, Va., to Petersburg, Va., based on proposed Georgia mileage scale, reduced 10% as of July 1, 1922.

24655. Slate, crushed or stone chips or granules in packages or in bulk. Carloads, minimum weight 60,000 lb. From Esmont (proper and when from beyond), Arvenia and Dutch Gap, Va., to Memphis, Tenn. Present rate, lowest combination; proposed, same rates as are in effect to Atlanta, Ga. (and group), Mobile, Ala., New Orleans, La. and Vicksburg, Miss., the rates to these points being from Esmont (proper), Arvenia and Dutch Gap, Va., \$4.77 per net ton and from Esmont (when from beyond), \$4.50 per net ton.

24661. Crude phosphate rock, lump or ground. Carloads, minimum weight 20 gross tons, except

when marked capacity of car is less, in which case the marked capacity of car will be the minimum weight, but in no case less than 18 gross tons, from Wallace, Ky., to Nashville, Tenn. Present rate, 16 cents per 100 lb. or \$3.58 per ton of 2240 lb. (fertilizer rate); proposed, \$3.25 per ton of 2240 lb., which compares favorably with rates in effect from other Southern fields.

24671. Feldspar. It is proposed to revise the present rates on feldspar. Carloads, minimum weight 50,000 lb. From Clinchfield and Black Mountain Ry. producing points to Camden, N. J., to be the same as currently in effect to Philadelphia, Penn.

24696. Slag. It is proposed to establish rates on slag, carloads, minimum weight marked capacity of car, except when cars are loaded to visible capacity, actual weight will govern. From Birmingham, Ala., and group to common and local points on the A. B. & A. Ry. in Georgia east of La Grange and south of Atlanta on basis of the mileage scale generally used in constructing slag rates from the Birmingham district to the southeast applied to the distance from Birmingham proper. Proposed rates to representative points on this basis are Thalman, \$1.98; Offerman, \$1.94; Waycross, \$1.89; Douglas, \$1.80; Fitzgerald, \$1.76; Tifton, \$1.80; Moultrie, \$1.85; Thomasville, \$1.85 Cordele, \$1.67; Montezuma, \$1.58; Manchester, \$1.44; Senoia, \$1.53; Union City, \$1.58 per net ton.

24710. Stone, crushed, etc. It is proposed to cancel the carload commodity rates published in Agt. Glenn's Northbound Commodity Tariff I. C. C. A498 applying on stone, crushed or rubble, from Atlanta, Ga., to Ohio River crossings, Memphis, Nashville, Tenn., St. Louis, Mo., East St. Louis, Ill., and Belleville, Ill., account of no movement. Class rates to apply after cancellation.

It is also proposed to make the rates published in Georgia R. R.'s Stone Tariff I. C. C. A46 on stone, crushed, rubble or granite sand, carloads, from Conyers, Lithonia, Redan and Stone Mountain, Ga., to Ohio River crossings, Memphis, etc., subject to Rule 77 of I. C. C. Tariff Circular 18A, as to intermediate points of origin via direct routes through Atlanta, Ga.

24719. Sand or gravel. It is proposed to cancel the present rate of 95 cents per net ton on sand or gravel, carloads, from Memphis, Tenn., to Pontotoc, Miss., account of no movement. Class or combination rates to apply after cancellation.

24738. Crushed stone. Carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Louisville, Ky., to Prospect, Ky. Present rate, 10½ cents per 100 lb. (Class A); proposed, 4 cents per 100 lb., made in line with rates applicable between stations on the L. & N. R. R. for similar distances.

24756. Granite or stone paving blocks. Carloads, minimum weight 90% of marked capacity of car, but not less than 60,000 lb., from Mooresville, N. C., to Philadelphia, Penn., and points taking same rates. Present rate, 45 cents per 100 lb. (Class A rate); proposed, \$3.49 per net ton, same as rate in effect from other North Carolina quarries.

24765. Gravel. Carloads, subject to present description and carloads, minimum weight, from Camden, Tenn., to Hurboldt, Tenn. Present rates: Via N. C. & St. L. and M. & O., \$1.13; via N. C. & St. L. and L. & N., \$1.24 per net ton. Proposed rate, 97 cents per net ton, same as rate from Elco and Gravel Pit, Ill.

24774. Crushed stone. It is proposed to cancel the present commodity rates as published in Southern Ry. I. C. C. A9979 from Toccoa, Ga., to Belton, Central, Columbia, Easley, East Spartanburg, S. C., Gastonia, N. C., Greer, S. C., Kings Mountain, N. C., Seneca, Spartanburg and Union, S. C., permitting the mileage rates as published in So. Ry. Crushed Stone Scale I. C. C. A9895 (which are lower) to apply.

24779. Granite and stone. It is proposed to establish rates on granite or stone carloads, and less than carloads, from Elberton, Ga., and Group to Henning, Tenn., the same as currently applicable to Ripley, Tenn. Combination rates now apply.

24782. Bituminous rock. It is proposed to establish through commodity rates on bituminous rock, carloads, from Bowling Green and Epleys, Ky., to stations on the Southern Ry. east of Decatur, Ala. Belle Mina, Ala., to Fackler, Ala., inclusive, such rates to be constructed on basis of Decatur, Ala., combination using local rate to Decatur, plus proportions required by Southern Ry. for their haul. The proposed rates range from

Pennsylvania Sand and Gravel Producers Win Important Case

\$2.48 to \$3.02 per net ton and are to apply in lieu of present combination rates.

24789. Sand. Carloads, minimum weight marked capacity of car, from St. Louis, Mo., to Memphis, Tenn. Class rates now apply. Proposed—15c per 100 lb. made in line with rates in effect from Ohio River crossings and Chicago, Ill., to Memphis, Tenn.

24794. Sand and gravel. It is proposed to cancel the present commodity rates on sand and gravel, from and to the following points, account of no movement: From Hamburg, S. C., to various points; from Blackville, S. C., to Charleston, S. C., and Atlanta, Ga.; from Windsor, S. C., to Augusta, Ga. The present rates are as shown in So. Ry. Sand-Gravel Tariff, I. C. C. A9890.

24845. Lime. Carloads, minimum weight 60,000 lb., from Burns, Tenn., to Erin and Palmyra, Tenn. Present rate 9½c per 100 lb. Proposed—\$1.10 per net ton and to automatically expire July 1, 1926. (Applicable only on intrastate traffic.)

Southwestern Freight Bureau Docket

6902. Bituminous rock, from points in the south-east to points in Missouri. To amend all tariffs applicable on bituminous rock, bituminous rock asphalt and rock asphalt, from points in Southern Freight Association territory to points in Southwestern Freight Bureau territory by making the commodity description read:

"Bituminous rock, crushed or ground. Carloads, minimum weight 80,000 lb. except when, for carriers' convenience, car of less capacity is furnished in which event marked capacity of car but not less than actual weight, will govern (in such instances bills should carry certificate over agent's signature 'Car of greater capacity not available'), but in no case less than 50,000 lb. The minimum weight will be charged for on each car when actual amount loaded is less." (Not applicable from points local to the Sou. Ry.)

A shipper directs attention to the manner in which this commodity is classified in tariffs covering rates thereon and it is desired to make the description uniform in all tariffs.

What Freight Rate Silica Sand Can Bear

WHAT looks like a favorable squint at the theory of putting on the traffic rates it can bear is given by Attorney-Examiner William A. Disque in his report on No. 17060, Frohman Chemical Co. vs. Baltimore and Ohio et al., a case involving the reasonableness of a rate of \$3.15 per ton on silica sand from points in the Ottawa district of Illinois to Sandusky, Ohio. The complaint alleged it was unreasonable to the extent it exceeded \$2.

Complainant compared the earnings on the traffic in question with those on other heavy loading commodities, as to which the transportation characteristics were testified to be substantially similar, or, in some instances, more burdensome. Disque reproduced a table of the comparisons, the articles compared with silica sand being iron ore, spelter, zinc ore roasted, common brick, pulp wood and sugar beets. Then he said the freight charges from the Ottawa district were more than double the stated average value of silica sand, which average was \$1.50 per ton. On the commodities with which comparison was made the freight charges, Disque said, were generally much less than half the value of the load. Further discussing the volume of the rate, Disque said:

Complainant contends that the value of the commodity and the cost of the service should be given primary consideration. However, these things are by no means controlling factors in determining proper rates on individual commodities. The public interest requires that the value of the service, or what the traffic can reasonably bear, be given important consideration. Silica sand is apparently shipped wherever it is needed, regardless of the freight rate. It goes to all sections of the country. The volume of the movement is heavy; in other words, the traffic moves freely.

Complainant's comparisons, as analyzed and discussed upon brief, have been fully considered.—*Traffic World*.

THE case of the Pennsylvania Sand and Gravel Producers' Association against the Baltimore and Ohio Railroad Co. et al., was decided recently by the Interstate Commerce Commission, the producers securing about all that they had asked for. This is the end of a series of litigations brought before the Public Service Commission of Pennsylvania and the Interstate Commerce Commission, beginning back in 1920. It is important to the whole mineral aggregate industry because of the principles laid down.

The complaint of the producers said that the sand and gravel rates were too high *per se*, as compared with the rates in other territories, and also that they were prejudicial as compared with the rates on crushed stone and slag in the same or contiguous territory. The commission decided both contentions in favor of the producers.

The National Sand and Gravel Association in what is known as the Central States Complaint included the situation of the Pennsylvania producers, but at that time, 1922, the commission decided that the rates in the central territory were not too high and it refused to recognize any local situation. Then the present case was brought (in 1923) by the following companies as the Pennsylvania Sand and Gravel Association: Crawford Sand and Gravel Co., J. K. Davison and Bro., Iron City Sand Co., Keystone Sand and Supply Co., Lake Shore Sand and Gravel Co., Mercer Sand Co., Nickel Plate Sand and Gravel Co., Ohio River Sand Co., Pittsburgh Sand and Supply Co., and Universal Sand Co. Most of these producers are in the Pittsburgh territory and all are in western Pennsylvania. The rates are on shipments to destinations in New York, Ohio and West Virginia, and 20 railroads were included in the complaint.

The right of sand and gravel producers to have a low rate for their product, on account of its nature, and the conditions under which it is transported, was upheld by the commission and the paragraph concerning this is so important that it is quoted in full:

"Sand and gravel are among the lowest grade commodities known to commerce, and cannot move except at low rates. They are transported exclusively in open top cars, loaded to and beyond the marked capacity of the car, the average being in excess of 50 tons, and move generally in as great a volume as slag or crushed stone. The average loading of 1238 cars from the Ambridge plant (Ohio River Sand Co.) in 1923 was 58.9 tons. Some plants load as high as 40 to 50 cars per day, and the entire day's output is generally moved from the plant at the time the empty cars are placed. An ample supply of empty cars is generally near at

hand, and loading is usually accomplished in 24 hours. The risk and liability of loss and damage is negligible. The movement is generally in train lots and it is considered desirable traffic."

Concerning the rates on sand and gravel as compared with crushed stone and slag, the commission says:

"Generally speaking, there is no transportation reason why the rates on sand and gravel should be higher than the rates on slag or crushed stone. In most territories and in the states they are given the same rates, and where we have prescribed scales in any territory or on all of them they have been rated the same. The rates complained of, considered as a whole, are clearly too high.

"We find that the defendants' rates on sand and gravel in carloads from complainants' shipping points in western Pennsylvania to destinations in Ohio, New York and West Virginia are, and for the future will be, unjust, unreasonable and unduly prejudicial, to the extent that they exceed the rates contemporaneously maintained on slag and crushed stone, in carloads, from and to the same points subject to the application of the following scales as a maximum for single line hauls, 20 cents per ton to be added for joint line hauls. In computing distances under this scale the shortest routes via existing connections for the interchange of carload traffic shall be used embracing as a maximum the lines of not more than three line-haul carriers."

Distance (miles)	Rate (cents)	Distance (miles)	Rate (cents)
20 and under.....	60	125 and over 100.....	110
40 and over 20.....	70	150 and over 125.....	120
60 and over 40.....	80	175 and over 150.....	130
80 and over 60.....	90	200 and over 175.....	140
100 and over 80.....	100		

The order for the above has been entered and the rates will go into effect March 15.

Oyster Shell Rates

A FINDING of undue prejudice and an order to remove it not later than March 15 have been made in No. 15946, Gulf City Manufacturing Co. vs. Apalachicola Northern et al., mimeographed, as to rates on crushed oyster shells, carloads, from Apalachicola, Fla., to Ohio and Mississippi crossings, and beyond. The commission, by division No. 1, said the rates were not unreasonable but unduly prejudicial to the extent those from Apalachicola to St. Louis, Cairo, Evansville, Louisville, Cincinnati, and points beyond exceed or may exceed the contemporaneously maintained rates from Pensacola and Mobile, to the same destinations, by more than 4.5 cents. It found the complainant had not been damaged and denied reparation. The finding includes oyster-shell dust.—*Traffic World*.

To Challenge "Government in Business"

A REBELLION by industry against the constant and growing intrusion of the government into the field of business activity is taking form. After watching bureaucracy extend itself amazingly during the post-war years in federal, state, county, and city governments to the detriment of private initiative, leaders engaged in all types of business pursuits are now planning to offer stubborn resistance.

The first marker of the new movement is found in the mass meeting of industrial leaders, held at Washington, December 10.

A preliminary meeting was held in Washington, with representatives of 22 leading trade associations present. The result of this meeting was appointment of the planning committee to issue the call for the December meeting and to suggest a program of action for the campaign.

The official call carried the names of the following members of the planning committee: Homer L. Ferguson, Newport News, Va., former president of the Chamber of Commerce of the United States, and president, Newport News Ship Building Co.; F. Highland Burns, Baltimore, president, Maryland Casualty Co. and president, International Association of Casualty and Surety Underwriters; J. E. Edgerton, Nashville, president of the National Association of Manufacturers and president, Lebanon Woolen Mills, and Gen. R. C. Marshall, Jr., general manager, Associated General Contractors of America, who is chairman of the committee.

The meeting was not directed against governmental regulation of industry, but its full force was thrown into opposition of the practice under which tax-paying business firms are forced to finance the government as an active competitor.

Preliminary study of the situation has definitely linked penetration of the government into business with desires by those in public office to perpetuate their tenure, magnify their functions or enlarge the field for political control and "spoils." These desires have been advanced in a manner so subtle as to cause Congress and the appropriating bodies of smaller units of government unwittingly to uphold the general practice.

The December meeting was held in Washington two days after Congress convened. Those who are anticipating the meeting's possibilities see a chance for the trend of conditions to be appreciated by the legislators. Most assuredly, say these observers, when once Congress comes to a realization of the manner in which the public funds are being expended in wasteful business activities, a change

of affairs will be forthcoming.

The certainty of mind in this connection is bolstered by the fact that the platforms of both major political parties strongly contend that the government should be kept out of business. Stress is being laid upon the fact that the nation has developed under the individualistic theory of government, and not under the socialistic. To quote from a recent decision by the Supreme Court of South Dakota, "The Constitution and laws of the United States and of the various states have been framed under a policy having primary regard for individual rights."

The number of individual industries that are mustering for the present attack on bureaucracy indicates the great variety of industrial enterprises into which the governmental units have thrust themselves. At the preliminary meeting held in Washington, October 20, representatives of more than a score of major industries cited case after case to show the scope of this intrusion.

Now that the situation is crystallizing,

Calcium and Tuberculosis

IN 1922, ROCK PRODUCTS sent out a questionnaire to all the lime plants in the United States in which they were asked to express their opinions and beliefs, based on actual observations, as to the effect of lime dust on their workers, with particular emphasis on those employees known to be tubercular. In supplement to this, another questionnaire of the same form was later sent to the gypsum plants. The replies to these questionnaires were startling. When printed in the January 24 issue of ROCK PRODUCTS they created comment all over the world. And it hasn't ended yet.

Miriam S. Iszard has recently finished some very interesting experiments in order to find out whether calcium dusts exert beneficial or detrimental action where there is a tuberculous involvement of the lungs. Rabbits were used as subjects and were in some cases inoculated with tuberculosis either before or after the lime dusting treatment. In all cases the entire groups of rabbits were exposed to equal amounts of lime dust over the same period of time.

The results of these experiments would appear to prove that calcium dusts in general are not harmful to the lungs. Tuberculosis development has been retarded by the action of the dust and more so in the cases where dusting follows the tubercular bacilli inoculation. While these experiments appear not to be conclusive, there is sufficient basis for much further work on this subject, for it is very evident that there is much that would be of great benefit to man-

it may be expected that conditions which individual minds have long known to exist will be forced into a position where a critical survey will be inevitable.

Among the charges which the meeting next month may be expected to develop for the attention of Congress, government officials and the public are the following:

1. Penetration of government bodies into business denotes almost invariably an effort by those in public office to perpetuate their tenure.
2. Lack of successful methods, efficient management and the driving force created by prospects of genuine industrial progress forces government production costs higher than those of private business organizations.
3. Government enterprises, usually launched under the pretext of saving money through elimination of private profit, almost invariably result in the wasting of public money, with the losses concealed by refusals to employ cost accounting systems that truly indicate expenses involved.
4. Extension of business activities in the realm of government is in exact accord with the dictates of the basic theories of communism.

kind to be derived from this source.

The entire experimental work and data of Miss Iszard can be found in the *Journal of Industrial Hygiene*, Vol. III, No. 2.

English Cement Plant Effects Large Savings by Cleaning Flue Gases

A CEMENT works in England is saving from £6 to £10 per day by cleaning the gases coming from the rotary kilns in which the cement is burned or roasted. These gases contain a considerable amount of dust, and, although they were formerly passed through dust settling chambers, only a small proportion of the dust was caught, the bulk being carried to the chimney and discharged into atmosphere. Apart from creating a nuisance to the surrounding neighborhood, it constituted a serious loss of valuable raw material, a point amply confirmed after the latest form of dust collecting apparatus had been put into operation. The apparatus in question is a patent dust collector made by Davidson & Co., Ltd., of Belfast, and is applied to the chimney serving the cement kiln. Prior to entering the chimney, the gases coming from the rotary kiln are passed through the collector, which cleans them thoroughly, and retrieves no less than 5 lb. of dust per minute. Considering that a cement kiln is usually in continuous operation for 24 hours per day for months at a time, hundreds of tons of dust are soon collected, the monetary saving being correspondingly large. — *British Commercial News*.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Making "Supertile" in California

Sunset Tile Company Makes a New Form of
Poured Tile Which Is Cured in the Molds

"SUPERTILE" is the trade name of a concrete building unit which is poured into the mold instead of being pressed or tamped. Poured concrete block made by various systems are in common use on the Pacific Coast, where this unit was developed. The difference between it and other poured tile is in the method of curing and handling. There are plants in operation at Redlands, Calif., Portland, Ore., and Seattle, Wash., and others building as this is written. The description here is of the Redlands plant.

The concrete is mixed in an ordinary mixer of local make, a 1:2:4 mix being used. The sand is a good quality of concrete sand from a local pit and the coarse aggregate is "No. 4 stone" about $\frac{3}{8}$ -in. in diameter, bought from a rock crushing company. The aggregate is measured into the mixer by buggies and the cement by the sack. It is given 2 minutes dry and 2 minutes wet mix.

The consistency is such that the concrete has a slump of $\frac{1}{2}$ in. Experience and the measuring of the materials, including the water, enables the mixer man to keep it at that consistency without regular testing. The mixer discharges directly onto a gang of molds and is "spaded" into them by rocking a plate with teeth over the molds so that the concrete is forced into them and all air spaces eliminated.

The molds in a gang of 16 for the 6-in. tile, are set on a cast iron plate which has the cast iron cores cast on it. When the molds are full they can be lifted from the

cores leaving holes where the cores were. The molds with the tile are put into a kiln for steam curing.

The manner in which this is done is an essential part of the process. The core plate and the gang of molds is carried on a movable platform which can be raised and lowered by a crank. The platform is set at the right level for pouring while the molds are being filled and then wheeled to the kiln. The platform is then raised or lowered

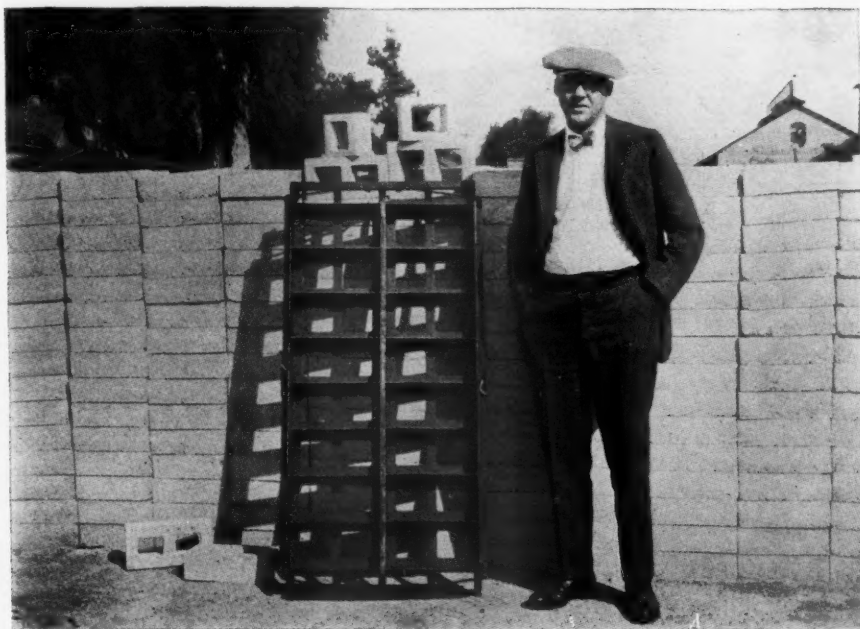
there are racks in the kiln. The arms are pushed under the molds and lifted by a lever so that all the molds in the kiln are removed in one operation. The emptied molds are piled on timbers to allow the truck to be run under them, the arms on the truck being pushed back to make room for the molds. The pile of molds is then lifted by the lever and wheeled back to the plant. Hence the five molds and 80 tile from each kiln are handled as a unit.

The molds of sheet steel and angle iron are emptied quickly. The angle iron sides are unlocked and fall down and the partitions between the tile swing to one side as the tile is removed. The molds can be used again immediately and in this plant the average use is three times in one day, which is possible, as the curing time is only 3 hours. They are sufficiently set in 3 hours to permit handling.

As the tile are cured in the mold there is no distortion and the faces come out true and square. The only irregularity is a slight "lip" on the edge of the core hole, which of course is of no impor-

tance. All tile are 12 in. long and $3\frac{5}{8}$ in. thick. They are made in 6-in. and 8-in. widths, and half-tile and quarter-tile are made for use at corners. This size fits in well with the usual Spanish architecture if the surface is not stuccoed and it also looks well in any kind of wall. It can be stuccoed without any preparation of the surface.

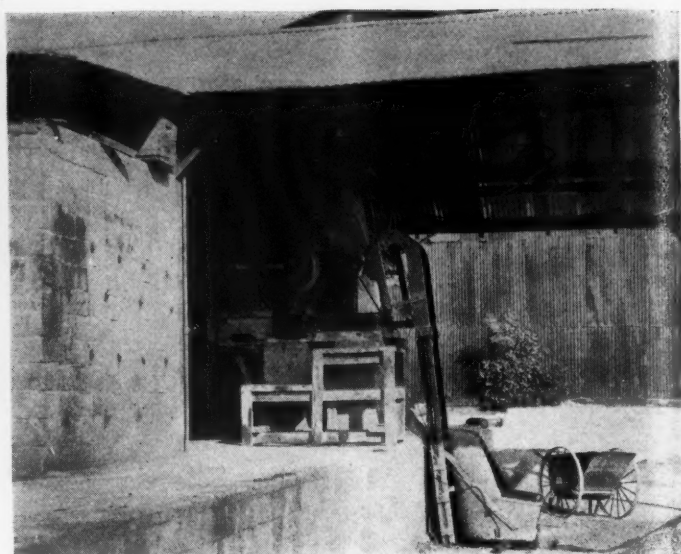
The plant will make 3500 tile per day with one stacker. If another stacker were to be



F. W. Moore, one of the owners of the Sunset Tile Co., Redlands, Calif., with one of the gang molds for the manufacture of poured concrete building units

as may be necessary until the molds are over a rack in the kiln. Then the platform is lowered, withdrawing the cores and leaving the molds in place on the rack. This machine is called the stacker. The angle iron racks in each kiln will hold five sets of molds.

The molds with the tile in them are taken from the kilns to the yard by a special armed truck. This has as many arms as



Left—Stacking machine with battery of cores in place. Right—Concrete mixer charged by the scoop at bottom of incline; buggy is used to measure aggregate for batch

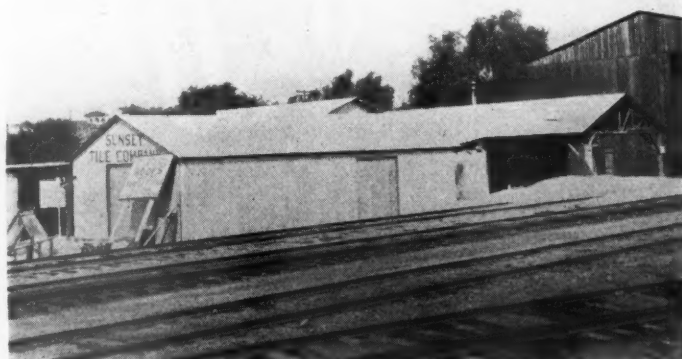
added this capacity might be considerably increased. The labor required is a mixer man, two men handling the molds and the stacker and two more removing the molds from the kiln and placing them in the yard. The company operates a roofing tile plant, using hand machines, made by the Enderly Machine Co. of Los Angeles, and uses the same crew to make roofing tile when the demand for "supertile" slackens.

As the concrete with a $\frac{1}{2}$ -in. slump is mixed to Professor Abrams' "normal consistency" the water-cement ratio is such that the full strength of the cement is developed. The tile are very strong—3000 lb. concrete. Some specimens have broken at more than 4000 lb. The absorption is around 5%,

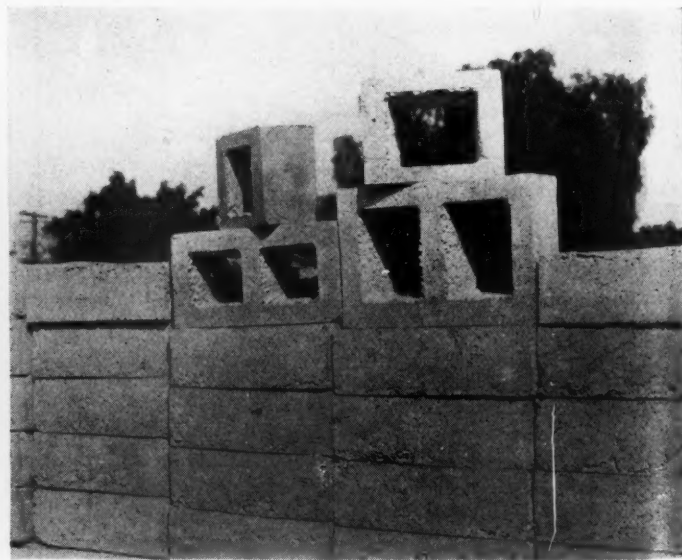
which is important in the Los Angeles market, as the building code of the city prohibits the use of block with more than 12% absorption.

The plant is owned by Moore Bros., who have a large packing plant and are interested in other important operations. The machinery was furnished by the Supertile

Machinery Corp. of Los Angeles. M. L. White is president of the company, and Stephen Flam is secretary and treasurer. Most of the devices used were invented by Mr. Flam. The process is interesting, as it is a simple method of making poured tile that can be used in any climate, and the machinery is so simple that it might be installed to make tile in plants which already have a cement block business established in localities in which Spanish architecture is in favor as it now is in so many places in the United States.



Sunset Tile Co.'s plant at Redlands, Calif.



Left—Lift truck used to carry tile in molds to the stacking yard. Right—Some of the finish building tile showing the half and three-quarter sizes made in addition to the regular units

Current Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City of shipping point	Sizes		
	8x8x16	8x10x16	8x12x16
Camden and Trenton, N. J.		.19‡	.30‡
Columbus, Ohio	.16@.18a		
Detroit, Mich.	16.00*		26.00*
Forest Park, Ill.	18.00*	23.00*	30.00*
Graettinger, Iowa	.18@.20		
Indianapolis, Ind.	.13@.15†		
Los Angeles, Calif.	4x3½x12—.03; 6x3½x12—.04½; 8x3½x12—.05½		
Oak Park, Ill.	.18@.21a		
Somerset, Pa.	.20@.22		
Yakima, Wash.	20.00*		

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡ Delivered.

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	
Ensley, Ala. ("Slag-tex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	18.00	25.00@50.00
Milwaukee, Wis.	15.00	25.00@45.00
Mt. Pleasant, N. Y.		14.00@23.00
Omaha, Neb.	18.00	30.00@40.00
Pasadena, Calif.	12.50	
Philadelphia, Penn.	‡15.25	‡21.50
Portland, Ore.	17.00	25.00@75.00
Prairie du Chien, Wis.	14.00	22.50
Rapid City, S. D.	18.00	25.00@40.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	21.00	35.00
Wauwatosa, Wis.	14.00	20.00@42.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	
†Gray. ‡Red.		

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.																	
Graettinger, Iowa	.04½d	.05½	.08½	.13	.17½		.50	.60	.75		.85						
Grand Rapids, Mich. (b)				.60	.72	1.00	1.28			1.92	2.32	3.00	4.00				
Houston, Texas		.19	.24	.43	.55½	.90	.130		‡1.70	2.20							
Indianapolis, Ind. (a)				.80	.90	1.10	1.30			1.70		2.70					
Longview, Wash.																	
Mankato, Minn. (b)											1.50	1.75	2.50	3.25	4.25		
Mt. Pleasant, N. Y.		.17	.26	.39	.50	.68	.93	1.29		1.67							
Norfolk, Nebr. (b)				.90	1.00	1.13	1.42			2.75		3.25	5.00				
Paulina, Iowa‡								2.25		2.11		2.75	3.58		6.14	7.78	
Somerset, Pa.					.80¹	1.00²	1.40³			2.00⁴		3.25⁵	4.00⁶	6.00⁷			
Tacoma, Wash.			4 in. to 18 in.														
Tiskila, Ill. (reinforced) (a)				.65	.75	.85	1.10	1.60		1.90			3.40				
Wahoo, Nebr. (b)					1.00	1.13	1.42			2.11		2.75	3.58	4.62	6.14	6.96	7.78
Waukesha, Wis.																	
Yakima, Wash.																	

*30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced. †21-in. diam. ‡Price per 2 ft. length. (d) 5 in. diam. ¹@1.08. ²@1.25. ³@1.65. ⁴@2.50. ⁵@3.85. ⁶@5.00. ⁷@7.50.

Cement Tile

Prices are net per sq. in carload lots, f.o.b. nearest shipping point unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.	
Red	15.00
Green	18.00
Cement City, Mich.—5"x8"x12", per M	55.00
Chicago, Ill.—per sq.	20.00
Detroit, Mich.—per 100	70.00
Grand Rapids, Mich.: Per 1000	
5x4x12	45.00
5x8x12	70.00
5x8x 6	35.00
Graettinger, Iowa.—Cement tile per 100 ft.	
5-in.	4.50
6-in.	5.50
8-in.	8.50
10-in.	12.50
12-in.	17.50
14-in.	22.50
16-in.	30.00
18-in.	35.00
20-in.	40.00
22-in.	45.00
24-in.	50.00

Houston, Texas.—Roofing Tile, per sq.

Red	17.00
Green	19.50
5x4x12 (Lightweight)	Per 1000 45.00
5x8x12 (Lightweight)	80.00
Indianapolis, Ind.—9"x15"	
Gray	10.00
Red	11.00
Green	13.00
Longview, Wash.—(Stone Tile) Per 1000	
4x6x12	60.00
4x8x12	65.00
Mt. Pleasant, N. Y.: Per 1000	
5x8x12	78.00
Pasadena, Calif.: Per 1000	
4x4x12	30.00
4x6x12	50.00
4x8x12	60.00
Waco, Texas: Per sq.	
4x4	.60
Wildasin Spur, Los Angeles, Calif:	
4x3½x12	.03½
6x3½x12	.04½
8x3½x12	.05½
Yakima, Wash.: 5x8x12	.10

product is made and much used in Australia, which is hardly known in the United States.

This product is a corrugated sheet used for building residences, warehouses and the lighter forms of structures. It was brought out to compete with the corrugated iron sheets which are so much used as siding in industrial buildings, and for residences in hot climates. Although somewhat higher in first cost it is cheaper in the end especially in the coastal climate in which corrugated iron deteriorates rather quickly.

The sheets are from ¼ in. to 5/16 in. in thickness and made in standard width and

THE National Concrete Products Association convention will be held in Chicago, February 25-26. An excellent program has been arranged and all are urged to attend.

Memphis Cement Products Companies To Combine and Erect Large Plant

THE growth of the White Tile Co. and the White Sundial Co. of Memphis, Tenn., has been such during the past year that it has become necessary to consolidate the interests and move to a larger site. The new company to be formed will be known as the White Stone Co.

A new plant for the manufacture of trim-stone and high test cement building tile will be erected on a site 334x417 ft., obtained for the purpose.

The plant 110x140 ft. will house the machinery necessary for the manufacture of

these cement products. Five steam curing kilns will be built to cure the material. In addition to the plant a 10-room residence and a four-car garage will be constructed.

The capital outlay of this plant will be approximately \$50,000. T. L. White, former president of the White Sundial Co., will be president of the White Stone Co. J. A. Scandlyn will be general manager.—*Memphis (Tenn.) Commercial.*

An Unusual Australian Cement Product

ACCORDING to F. S. Richards, who was formerly with the Kandos Cement Co., of Sidney, Australia, a form of cement

lengths. There is no reinforcing but the sheets are somewhat flexible as they are made of 5% asbestos fiber and 95% of neat portland cement. They are strong and the corrugations will resist a weight of 450 lb. to the square inch before breaking down.

Mr. Richards said there was such a call for these sheets that one concern which made them took 600 bbl. of cement weekly from the Kandos company. They are used not only in Australia but in the Pacific islands. The same company that manufactures these sheets also makes plain sheets that may be used for siding, roofing and as wallboard.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

City or shipping point	Crushed Limestone					
	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Carey, Ohio	.65@.75	.90@1.10	.85@1.00	.80@.90	.80@.90	.80@.90
Chaumont, N. Y.	.50	1.65	1.65	1.25	1.25	1.25
Chazy, N. Y.	.75	1.65	1.65	1.40	1.40	1.40
Cobleskill, N. Y.	1.50	1.35	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.35	1.35	1.35	1.35	1.35	1.35
Frederick, Md.	.50	.75	1.30	1.20	1.10	1.10
Munns, N. Y.	1.00	1.40	1.40	1.40	1.25	1.25
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	1.40@1.60
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	1.30
Walford, Penn.	1.00	1.30	1.30	1.50h	1.50h	1.50h
Watertown, N. Y.	.50	1.75	1.50	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Afton, Mich.	1.75	1.75	1.75	1.75	1.75	1.75
Alton, Ill.	1.75	1.75	1.75	1.75	1.75	1.75
Bloomville, Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo, Iowa	1.20	1.15	1.15	1.15	1.15	1.15
Chasco, Ill.	1.00@1.50	1.20@1.25	1.20@1.25	1.20	1.20	1.50
Columbia, Krause, Valmeyer, Ill.	1.00@1.50	1.20@1.25	1.20@1.25	1.20	1.20	1.50
Cypress, Ill.	1.15	1.15	1.15	1.15	1.05	1.00
Gary, Ill.	1.00	1.37½	1.37½	1.37½	1.37½	1.37½
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Milltown, Ind.	.75@.90	.75@.90	.85@.90	.85@.90	.85@.90	.85@.90
Northern New Jersey	1.30	1.80	1.60	1.40	1.40	1.40
River Rouge, Mich.	1.10	1.10	1.10	1.10	1.10	1.10
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Stone City, Iowa	.75	1.10†	1.05	1.00	1.00	1.00
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
SOUTHERN:						
Allgood, Ala.	1.65	1.65	1.65	1.15	1.15	1.15
Cartersville, Ga.	.90	1.35	1.35	1.25	1.20	1.10
Chico, Texas	1.00	1.10	1.00	1.00	1.00	1.00
El Paso, Texas	.50	1.60	1.50	1.35	1.25	1.25
Ft. Springs, W. Va.	1.50	1.50	1.50	1.25	1.25	1.25
Graystone, Ala.	1.50	1.50	1.50	1.25	1.25	1.25
Henderson, N. C.	.50@.60	1.00@1.20	1.00@1.20	.80@1.00	.75@.90	.75@.90
New Braunfels, Texas	.50@1.00†	1.00	1.00	1.00	1.00	1.00
Olive Hill, Ky.	.50@1.00	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
Rocky Point, Va.	.25	2.00	2.00	2.00	2.00	1.60@1.80
WESTERN:						
Atkinson, Kans.	.25	2.00	2.00	2.00	2.00	1.60@1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25	1.25	1.25	1.25	1.00	1.00
Kansas City, Mo.	1.00	1.80	1.80	1.80	1.80	1.80
Kirkfield, Ontario	.70	1.05	.90	.90	.90	.90
Rock Hill, St. Louis county, Mo.	1.35	1.35	1.35	1.35	1.35	1.35

City or shipping point	Crushed Trap Rock					
	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	1.05
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.00	1.00	1.00	.90	.90	.90
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knappa, Texas	2.50	2.00	1.55	1.40@1.50	1.25	1.25
New Haven, New Britain, Meriden & Wallingford, Conn.	.60	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.70e	2.20	2.00	1.60	1.60	1.60
Oakland and El Cerritto, Cal.	1.00	1.00	1.00	.90	.90	.90
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	1.10
Springfield, N. J.	1.70	2.10	2.10	1.80	1.80	1.80
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Crushed Limestone					
	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	1.40
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Columbia, S. C.—Granite			1.75	1.50	1.50	1.50
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Havelock, Ontario		2.60	2.10	2.10	2.10	2.10
Lithonia, Ga.	.75	1.75	1.60	1.40	1.35	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	1.50
Middlebrook, Mo.—Granite	3.00@3.50	2.00@2.25	2.00@2.25	2.00@2.25	1.25@2.00	1.25@2.00
Northern New Jersey (Basalt)	1.50	2.00	1.80	1.40	1.40	1.40
Richmond, Calif.—Quartzite	.75*	1.50*	1.50*	1.50*	1.50*	1.50*
Somersett, Pa. (sand-rock)	1.85@2.00a	1.35@1.50	1.35@1.50	1.00@1.50	1.00@1.50	1.00@1.50
Toccoa, Ga. (granite)	1.50	1.25	1.25	1.25	1.25	1.25

*Cubic yd. †1 in. and less. ‡Two grades. §Rip rap per ton. (a) Sand. (b) to ½ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Dust. (f) ¼ in. (h) less 10c discount. (i) 1 in., 1.40.

Agricultural Limestone (Pulverized)

Alton, Ill.—Analysis 99% CaCO ₃ , 0.3% MgCO ₃ ; 90% thru 100 mesh.....	6.00
Asheville, N. C.—Analysis, 57% CaCO ₃ , 39% MgCO ₃ ; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Belfast and Rockland, Me. (rail), Lincolnville, Me. (water), analysis CaCO ₃ 90.04%; MgCO ₃ 1.5%, 100% thru 14 mesh, bags.....	4.50
Bulk	3.00
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers).....	5.00
Cape Girardeau, Mo.—Analysis, 93% CaCO ₃ , 3.5% MgCO ₃ ; pulverized; 50% thru 50 mesh.....	1.50
Cartersville, Ga.—Analysis 68% CaCO ₃ , 32% MgCO ₃ ; pulverized.....	2.50
50% thru 50 mesh.....	2.00
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk.....	2.50
Chico, Tex.—½ in. down.....	1.50
200 mesh.....	10.00
Colton, Calif.—Analysis 90% CaCO ₃ , bulk.....	4.00
Cypress, Ill.—90% thru 100 mesh.....	1.35
Danbury, Conn., Rockdale and West Stockbridge, Mass.—Analysis, 90% CaCO ₃ , 5% MgCO ₃ ; 50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk.....	3.25
Henderson, N. C. (paving dust)—80% thru 200 mesh, bags.....	4.25@ 4.75
Bulk.....	3.00@ 3.50
Analysis CaCO ₃ 56%; MgCO ₃ 42%; 65% thru 200 mesh, bags.....	3.95
Bulk.....	2.70
Hillsville, Penn.—Analysis, 94% CaCO ₃ , 1.40% MgCO ₃ ; 75% thru 100 mesh; sacked.....	5.00
Jamesville, N. Y.—Analysis, 89.25% CaCO ₃ ; 5.25% MgCO ₃ ; pulverized, bags, 4.00; bulk.....	2.50
Knoxville, Tenn.—Analysis, 52% CaCO ₃ , 37% MgCO ₃ ; 80% thru 100 mesh; bags, 3.95; bulk.....	2.70
80% thru 200 mesh, bulk.....	3.50
Marblehead, Ohio—Analysis, 83.54% CaCO ₃ , 14.92% MgCO ₃ ; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.10; bulk.....	3.60
Marion, Va.—Analysis, 90% CaCO ₃ , pulverized, per ton.....	2.00
Mayville, Wis.—Analysis, 54% CaCO ₃ , 44% MgCO ₃ ; 90% thru 100 mesh.....	3.90@ 4.50
Milltown, Ind.—Analysis, 94.50% CaCO ₃ , 33% thru 50 mesh, 40% thru 50 mesh; bulk.....	1.35@ 1.60
Olive Hill, Ky.—Bulk.....	2.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100.....	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk.....	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk.....	5.50
Rocky Point, Va.—Analysis 99.5% CaCO ₃ , 0.25% MgCO ₃ ; 50% thru 200 mesh; bags, 3.25@3.50; bulk.....	2.00@ 2.25
Waukesha, Wis.—90% thru 100 mesh.....	4.50
Watertown, N. Y.—Analysis, 96.99% CaCO ₃ ; 50% thru 100 mesh; bags, 4.00; bulk.....	2.50

Agricultural Limestone (Crushed)

Alton, Ill.—Analysis 99% CaCO ₃ , 0.3% MgCO ₃ ; 50% thru 4 mesh.....	3.00
Atlas, Ky.—Analysis over 90% CaCO ₃ ; 90% thru 4 mesh.....	1.00@ 2.00
Bedford, Ind.—Analysis, 98.5% CaCO ₃ , 0.5% MgCO ₃ ; 90% thru 10 mesh.....	1.50
Bettendorf, Iowa—97% CaCO ₃ , 2% MgCO ₃ ; 50% thru 100 mesh; 50% thru 4 mesh.....	1.50
Blackwater, Mo.—Analysis, 99% CaCO ₃ ; 90% thru 4 mesh.....	.75
Bridgeport and Chico, Texas—Analysis, 94% CaCO ₃ , 2% MgCO ₃ ; 100% thru 10 mesh.....	1.75
50% thru 4 mesh.....	1.50
Chasco, Ill.—50% thru 100 mesh.....	1.20
Chico, Texas—90% thru 4 mesh; bulk.....	1.50

(Continued on next page)

Agricultural Limestone

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh.....	.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% CaCO ₃ ; 90% thru 4 mesh.....	1.35
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh.....	1.35
Ft. Springs, W. Va.—Analysis, 90% CaCO ₃ ; 90% thru 50 mesh.....	1.50
Garnet, Okla.—All sizes.....	1.25
Gary, Ill.—Analysis, approx. 60% CaCO ₃ , 40% MgCO ₃ ; 90% thru 4 mesh.....	.90
Kansas City, Mo.—50% thru 100 mesh.....	1.25
Lannon, Wis.—Analysis, 54% CaCO ₃ , 44% MgCO ₃ ; 99% through 10 mesh; 46% through 60 mesh.....	2.00
Screenings (¼ in. to dust).....	1.00
Marblehead, Ohio.—Analysis, 83.54% CaCO ₃ , 14.92% MgCO ₃ , 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk.....	1.60
Mayville, Wis.—Analysis, 54% CaCO ₃ , 44% MgCO ₃ ; 50% thru 50 mesh.....	1.85 @ 2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% CaCO ₃ , 54% MgCO ₃ ; meal, 25 to 45% thru 100 mesh.....	1.60
Milltown, Ind.—Analysis CaCO ₃ , 93.10%, 40% thru 50 mesh.....	1.35 @ 1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% CaCO ₃ , 2% MgCO ₃ ; 50% thru 100 mesh; 50% thru 4 mesh.....	1.50
Pixley, Mo.—Analysis, 96% CaCO ₃ ; 50% thru 50 mesh.....	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh.....	1.65
River Rouge, Mich.—Analysis, 54% CaCO ₃ , 40% MgCO ₃ ; bulk.....	.80 @ 1.40
Stone City, Iowa.—Analysis, 98% CaCO ₃ ; 50% thru 50 mesh.....	.75
Tulsa, Okla.—Analysis CaCO ₃ , 86.15%, 1.25% MgCO ₃ , all sizes.....	1.25
Waukesha, Wis.—100% thru 10 mesh; bags, 2.85; bulk.....	2.10

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk.....	3.00
Piqua, Ohio, sacks, 4.50@5.00 bulk.....	3.00 @ 3.50
Rocky Point, Va.—80% thru 200 mesh; bags.....	4.25 @ 4.75
Waukesha, Wis.—90% thru 100 mesh, bulk.....	3.70

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W. Va.—Glass sand.....	2.25
Cedarville and S. Vineland, N. J.—Damp.....	1.75
Dry.....	2.25
Cheshire, Mass.: 6.00 to 7.00 per ton; bbl.....	2.50
Columbus, Ohio.....	1.25 @ 1.50
Estill Springs and Sewanee, Tenn.....	1.50
Franklin, Penn.....	2.25
Gray Summit and Klondike, Mo.....	2.00
Los Angeles, Calif.—Washed.....	5.00
Mapleton Depot, Penn.....	2.00 @ 2.25
Massillon, Ohio.....	3.00
Mineral Ridge and Ohlton, Ohio.....	2.50
Oceanside, Calif.....	3.00
Ottawa, Ill.—Chemical and mesh guaranteed.....	1.25
Pittsburgh, Penn.—Dry.....	4.00
Damp.....	3.00
Red Wing, Minn.: Bank run.....	1.50
Ridgway, Penn.....	2.00 @ 2.25
Rockwood, Mich.....	2.75 @ 3.25
Round Top, Md.....	2.25
San Francisco, Calif.....	4.00 @ 5.00
St. Louis, Mo.....	2.00
Sewanee, Tenn.....	1.50
Thayers, Penn.....	2.50
Utica, Ill.....	1.00 @ 1.15
Zanesville, Ohio.....	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio.....	1.50 @ 2.00	
Columbus, Ohio.....	.30 @ .90	
Eau Claire, Wis.....	4.25	.65 @ 1.00
Estill Springs and Sewanee, Tenn.....	1.35 @ 1.50	1.35 @ 1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95	.....	.....	.85	.....
Erie, Pa.	.....	1.00*	.....	1.50*	1.75*	.....
Farmingdale, N. J.	.58	.48	1.05	1.20	1.10	.....
Hartford, Conn.	.65*	.....	.....	.....	.....	.....
Leeds Junction, Me.	.....	.50	1.75	.....	1.35	1.25
Machias Jct., N. Y.	.....	.75	.75	.....	.75	.75
Montoursville, Pa.	1.35	1.00	.90	.85	.75	.75
Northern New Jersey	.50	.50	1.25	1.25	1.25	.....
Olean, N. Y.	.....	.75	.75	.75	.75	.75
Shining Point, Penn.	.....	.....	1.00	1.00	1.00	1.00
Somerset, Pa.	1.85 @ 2.00	.....	.....	1.35 @ 1.50	.....	.....
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.50	.50	.75	.75	.75	.75
Boston, Mass.†	1.50	1.50	2.50	.....	2.50	2.50
Chicago, Ill.	.70	.50	.50	.60	.60	.60
Columbus, Ohio	.70	.70	.70	.70	.70	.....
Des Moines, Iowa	.40	.40	1.20	1.50	1.50	1.50
Eau Claire, Wis.	.65	.50	1.00	.....	.95	.....
Elgin, Ill.	.20*	.50*	.....	1.50*	1.50*	1.50*
Elkhart Lake, Wis.	.60	.60	.60	.75	.50	.50
Ferrysburg, Mich.	.50 @ .80	.60 @ 1.00	.60 @ 1.00	.60 @ 1.00	.50 @ 1.25	.50 @ 1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Haven, Mich.	.40 @ .80	.....	.....	.60 @ 1.00	.....	.....
Grand Rapids, Mich.	.50	.50	.90	.80	.80	.70
Hamilton, Ohio	.....	1.00	.....	.....	1.00	.....
Hersey, Mich.	.....	.50	.....	.70	.70	.60
Humboldt, Iowa	.....	.85	2.00	2.00	2.00	.....
Indianapolis, Ind.	.60	.60	.....	.90	.75 @ 1.00	.75 @ 1.00
Mason City, Iowa	.45 @ .55	.45 @ .55	1.35 @ 1.45	1.45 @ 1.55	1.40 @ 1.50	1.35 @ 1.45
Mankato, Minn.	.....	.50	1.35	.60e	1.35	1.35
Mattoon, Ill.	.75	.75	.75	.75	.75	.75
Milwaukee, Wis.	.....	1.01	1.21	1.21	1.21	1.21
Moline, Ill.	.60 @ .85	.60 @ .85	1.00 @ 1.20	1.00 @ 1.20	1.00 @ 1.20	1.00 @ 1.20
Northern New Jersey	.50	.50	1.25	1.25	1.25	.....
Oregon City, Ore.	.....	1.25	1.25	1.25	1.25	1.25
Palestine, Ill.	.75	.75	.75	.75	.75	.75
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	1.18	1.45	1.65	1.45	1.65	1.45e
Terre Haute, Ind.	.60	.60	.85	.85	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.	.....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.	.....	.40 @ .70	.30 @ .50	.50 @ .60	.60	.60
Zanesville, Ohio	.70	.60	.50	.....	.80	.....
SOUTHERN:						
Charleston, W. Va.	.....	.....	All sand, 1.40.	All gravel, 1.50.	.....	.....
Chattanooga, Tenn.	.....	1.45	.....	.....	1.20	1.20
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.00
Lindsay, Texas	.....	.....	.....	.....	.55	.....
Macon, Ga.	.50	.50	.....	1.00	1.00	1.00
New Martinsville, W. Va.	1.00	.90 @ 1.00	1.20	.....	.80 @ .90	.....
Roseland, La.	.25	.20	1.50	.85	.75	.75
WESTERN:						
Kansas City, Mo.	.80	.70	.....	.....	.....	.....
Los Angeles, Calif. (points all around) (d)	.60	.50	.85	.85	.85	.85
Los Angeles district (bunkers)†	1.50	1.40	1.85	1.85	1.85	1.85
Phoenix, Ariz.	1.25*	1.00*	2.50*	2.00* @ 2.25*	1.75*	1.50*
Pueblo, Colo.	1.10*	.90*	.....	1.80*	.....	1.60*
San Diego, Calif.	.....	.60	1.25	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.	.....	.....	.....	.....	.....	.....
Boonville, N. Y.	.60 @ .80	.....	.55 @ .75	.....	.....	1.00
Chicago, Ill.	.95	.....	.....	.....	.....	.....
Des Moines, Iowa	.50	.....	.....	.....	.....	.....
Dudley, Ky. (crushed silica)	1.10	1.10	.....	.....	.....	.....
East Hartford, Conn.	.....	.....	.....	Sand, .75*	.90	.....
Elkhart Lake, Wis.	.50	.....	.....	.....	.....	.....
Ferrysburg, Mich.	.....	.....	.....	.....	.....	.65 @ 1.00
Gainesville, Texas	.....	.95	.....	.....	.....	.55
Grand Rapids, Mich.	.50	.50	.....	.60	.....	.....
Hamilton, Ohio	.....	.....	.....	.50	.70	.....
Hersey, Mich.	.....	.....	.....	.....	.....	.....
Indianapolis, Ind.	.....	.....	.....	.....	.....	.....
Lindsay, Texas	1.30	.....	.....	.....	.....	.....
Macon, Ga.	.40	.....	.....	.....	.....	.....
Mankato, Minn.	.....	.....	.....	.....	.....	.....
Moline, Ill. (b)	.60	.60	.....	.....	.....	.....
Ottawa, Oregon, Moronto and Yorkville, Ill.	.....	.....	.....	.....	.....	.....
Roseland, La.	.60	.....	.....	.....	.....	.....
St. Louis, Mo.	.....	.....	.....	.....	.....	.....
Shining Point, Penn.	.....	.....	.....	.....	.....	.....
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10	1.00	.....	.....	.....	.....

(a) ¼ in. down. (b) River run. (c) 2½ in. and less.

*Cubic yd. †Include freight and bunkering charges and truck haul. ‡Delivered on job.

(d) Less 10c per ton if paid E.O.M. 10 days. (e) pit run.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@.35			
Albany, N. Y.	2.75	2.75	2.75	1.00@2.75		1.25@4.00	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75@2.25	1.75@2.25		1.75	2.00@2.50		1.75
Columbus, Ohio	2.00@2.50	1.50@2.50	2.00@3.00	.20@.30	2.50	3.50@4.50	1.50@2.00
Eau Claire, Wis.				1.00		3.00	
Elco, Ill.		Ground silica per ton in carloads—18.00@31.00					
Elmora, N. Y.				1.75			
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	2.00	2.00	2.00	2.00			
Gray Summit and Klondike, Mo.	1.75	1.75	2.00	2.00	1.00		.85@1.00
Joliet, Ill.	No. 2 molding sand; loam for luting and open hearth work—					.65@.85	1.00
Kasota, Minn.							
Mapleton Depot, Penn.	2.00	2.00			2.00		
Massillon, Ohio	2.50			.15@.30	2.00		
Michigan City, Ind.							
Mineral Ridge and Ohlton, Ohio	2.00*	1.75		2.00*	1.75	1.75*	
Montoursville, Pn.				1.25@1.40			
New Lexington, O.	2.50	2.25					
Ottawa, Ill.	1.00@1.25						
Red Wing, Minn.	1.25		1.25	1.50	1.50	3.50	1.50
Ridgeway, Penn.	1.50	1.50		2.00			
Round Top, Md.			1.60			2.25	
San Francisco, Calif.	3.50	4.75	3.50	3.50@5.00	3.50@4.50	3.50@5.00	
Tamaleco, Ill.	1.50@1.75						
Tammis, Ill.		Ground silica per ton in carloads—20.00@31.00					
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.	.75	.80		.80	.80		
Utica, Penn.	1.75	1.75		2.00			
Warwick, Ohio	1.75* @2.25	1.75*		1.75* @2.25			
Zanesville, Ohio	2.75@3.00	1.75@2.25	2.75				

*Damp. †Crude silica, not washed or dried.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium	2.25	1.25	1.25	1.25	1.25	1.25	1.25
nd Dubois, Pa.							
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio		1.45		1.45		1.45	
Jackson, Ohio		1.05		1.30	1.05		1.30
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55		1.55	1.55	1.55	
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.		.80	.90@1.25	.90@1.25	.90@1.05	.90	.90

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk. Bags	Lump lime, Blk. Bbl.
EASTERN:						
Berkeley, R. I.			12.00			2.20
Buffalo, N. Y.		12.00	12.00	12.00		2.00
Chazy, N. Y.	12.50	9.50	9.00	13.50	11.50 16.50	10.50 2.90
Lime Ridge, Penn.			5.60			5.00a
West Stockbridge, Mass.	12.00	10.00	10.00			2.00t
Williamsport, Penn.			10.50	10.50		8.00 1.65i
York, Pa.		9.50	10.50			
CENTRAL:						
Afton, Mich.						8.50 1.46
Carey, Ohio	12.50	8.50@9.50	9.50		9.50	9.00
Cold Springs, Ohio (f)	12.50	10.00	9.00		9.00 11.00	9.00
Delaware, Ohio	12.50	10.00	9.00	10.00		9.00 1.50
Frederick, Md.		10.00	9.50	10.00		7.50 1.45
Gibsonburg, Ohio (f)	12.50	8.50	8.50		9.00 11.00	8.00
Huntington, Ind.	12.50	8.50	8.00			
Luckey, Ohio (f)	12.50					
Marblehead, Ohio		8.50	8.00			9.00 1.50c
Marion, Ohio		8.50	8.00			
Milltown, Ind.		9.00@10.00		10.00p		8.00a 1.40n
Sheboygan, Wis.						9.50
Tiffin, Ohio					9.00	
White Rock, Ohio	12.50				9.00 11.00	
Wisconsin points (f)		11.50				9.50
Woodville, Ohio	12.50	8.50	8.50	13.50	9.00 11.00	8.00 1.50e
SOUTHERN:						
Allgood, Ala.	12.50	10.00			8.50	8.50 1.50
El Paso, Tex.						14.00 1.75
Graystone, Landmark and Wilmay, Ala.	12.50	10.00				8.50 1.50
Keystone, Ala.	12.00	10.00	10.50	10.00	9.00	8.50 1.50u
Knoxville, Tenn.	20.25	10.00@11.00	10.00	10.00		8.50 1.50
Ocala, Fla.	13.00		13.00		1.60	12.00 1.70
WESTERN:						
Calcite, Colo.						9.00!'
Kirtland, N. M.						15.00
New Braunfels, Texas	12.00	12.00	10.00	12.00		9.50 1.50
San Francisco, Calif.	21.00	21.00	12.50@15.00	21.00		14.50 1.90v
Tehachapi, Calif.			8.00			13.00z 2.20x
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00	18.60 2.30

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) per 180-lb. barrel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 180-lb. net barrel 1.65; 280-lb. net barrel, 2.65 (m) finishing lime, 3.00 common; (n) common lime; (o) high calcium; (p) to 11.00; (q) to 8.50; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) to 3.00; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (†) paper bags; (w) to 1.50 in two 90-lb. bags, wood bbl. 1.60; (‡) to 10.00; (‡) 80-lb. paper bags; (‡) 180 lb. net, 187 lb. net, 1.70. (a) to 9.00.

Miscellaneous Sands

(Continued)

Gray Summit and Klondike, Mo.	2.00	1.75
Mapleton, Depot, Penn.		2.00
Massillon, Ohio		2.25
Mineral Ridge and Ohlton, Ohio	*1.75@ 2.00	*1.75
Montoursville, Penn.		1.35
Red Wing, Minn.		1.25
Round Top, Md.		2.25
San Francisco, Calif.	3.50@ 4.50	3.50@ 4.50
Thayers, Penn.		2.25
Warwick, Ohio		2.25

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point, Baltimore, Md.:

Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons, per gross	.08
Chatsworth, Ga.:	
Chatsworth, Ga.:	
Crude talc	5.00@ 6.00
Ground (20-50 mesh), bulk	7.50@10.00
Ground (150-200 mesh), bulk	8.00@16.00
Pencils and steel worker's crayons, per gross	1.50
Chester, Vt.:	
Ground (150-200 mesh), bulk	8.00@ 9.00
Including bags	10.00@11.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc	5.00
Ground talc (150-200) bags	10.00
Pencils and steel workers' crayons, per gross	1.00@ 2.50
Emeryville, N. Y.:	
(Double air floated) including bags;	
325 mesh	14.75
200 mesh	13.75
Halesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.50
Ground talc (150-200 mesh), bags	9.75@15.00
Joliet, Ill.:	
Ground talc (150-200) bags	12.00@30.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), bags	13.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%	4.50@ 5.00
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.	5.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@ 8.00

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%	7.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 65%; bulk	7.25
Twomey, Tenn.—B.P.L. 65%	7.00@ 8.00

Florida Phosphate

(Raw Land Pebble)
(Per Ton.)

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	3.00
70% min. B.P.L., Basis 70%	3.55
72% min. B.P.L., Basis 72%	4.10
75/74% B.P.L., Basis 75%	4.85
77/76% B.P.L., Basis 77%	5.60

Fluorspar

Fluorspar, 85% and over calcium fluoride, not over 5% silica, per net ton, f.o.b. Illinois and Kentucky mines	16.00
No. 2 lump, per net ton	19.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per net ton	16.00
Fluorspar, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, per net ton, f.o.b. Illinois and Kentucky mines	32.50

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis.—f.o.b. cars		10.50
Brandon, Vt.—English pink and English cream	*11.00	*11.00
Buckingham, Que.—Buff stucco dash		12.00@14.00
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Pa.—Green grits or facings		*8.00
Haddam, Conn.—Feltstone buff	15.00	15.00
Harrisonburg, Va.—Blk marble (crushed, in bags)	12.50	12.50
Ingomar, Ohio		8.00
Middlebrook, Mo.—Red Middlebury and Brandon, Vt.—Middlebury white	7.00@11.00	7.00@11.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Calif.—"Natrock" roofing grits		10.00@20.00
Tuckahoe, N. Y.		10.00
Villa Grove, Colo.		13.00
Wauwatosa, Wis.		16.00@45.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00
*C.L. Less than C.L., 15.50.		
*C.L. including bags; L.C.L. 14.50.		
†C.L. including bags.		

Potash Feldspar

Auburn and Brunswick, Me.—Color, white; 98% thru 140 mesh bulk	19.00
Bath, Me.—Color, white; analysis, potash, 12%; 100% thru 180 mesh, bags, 21.00; bulk	18.00
Buckingham, Que.—Color, white; analysis, K ₂ O, 12-13%; Na ₂ O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk (crude)	8.00
East Hartford, Conn.—Color, white (60-80 mesh); bags	17.00@20.00
Finer grades	20.00@30.00
Erwin, Tenn.—Color, white; analysis, 12.07% K ₂ O, 19.34% Al ₂ O ₃ ; Na ₂ O, 2.92%; SiO ₂ , 64.76%; Fe ₂ O ₃ , .36%; 98.50% thru 200 mesh, bags, 16.90; bulk	15.50
Los Angeles, Calif.—Color, white; analysis, K ₂ O, 10.35%; Na ₂ O, 3.62%; Al ₂ O ₃ , 18.71%; SiO ₂ , 65.48%; Fe ₂ O ₃ , .17%; 100% thru 150 mesh, bags, 24.00; bulk	22.00
Murphersboro, Ill.—Color, prime white; analysis K ₂ O, 12%; Na ₂ O, 2%; 65% SiO ₂ ; crude, bags, 7.00; bulk	6.50
Pulverized; 98% thru 200 mesh, bags, 22.00; bulk	21.00
99% thru 100 mesh, bags, 21.00; bulk	20.00
100% thru 100 mesh; bags, 20.00; bulk	19.00

Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Tenn. Mills—Color, white; analysis K ₂ O, 18%; Na ₂ O, 10%; 68% SiO ₂ ; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Toronto, Can.—Color, flesh; analysis K ₂ O, 12.75%; Na ₂ O, 1.96%; crude, bulk	7.75
98% thru 180 mesh, bags, 21.00; bulk	20.00
Trenton, N. J.—Crude, bulk	12.00@27.00
99% thru 140 mesh; bulk	16.00
(Bags 11 cents each, non-returnable)	
Wheeling, W. Va.—Color, white; analysis, K ₂ O, 9.50%; Al ₂ O ₃ , 16.70%; Na ₂ O, 3.50%; SiO ₂ , 69.50%; 99% thru 140 mesh, bulk	19.00
Glen Tay, Ontario, Can.—Color, flesh red to pink; analysis, K ₂ O, 12.81%; Fe ₂ O ₃ , .11%, etc., crude, bulk	6.50@ 7.50

Blended Feldspar
(Pulverized)

Tenn. Mills—Bulk	16.00@20.00
Toughkenamon, Pa.—Color, white to light cream; 98% thru 125-150 mesh, bags, 12.00@13.00; bulk	10.00

Chicken Grits

Belfast and Rockland, Me.—(Limestone), bulk, per ton	11.00
Los Angeles Harbor (limestone), 100-lb. sack, 1.00; sacks, per ton, 8.50@ 9.50†; bulk, per ton	6.00@7.00†
Toughkenamon, Pa.—(Feldspar) 100-lb. bags, 1.00; bulk, per ton	10.00
Danbury, Conn., Rockdale and West Stockbridge, Mass.—(Limestone) bulk	7.50@9.00*
Gypsum, Ohio.—(Gypsum) per ton	15.00
Seattle, Wash.—(Limestone), bulk, per ton	12.50

*L.C.L.
†Less than 5-ton lots.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	14.50
Brighton, N. Y.	*19.75
Dayton, Ohio	12.50@13.50
Detroit, Mich.	14.00
Farmington, Conn.	18.00
Flint, Mich.	12.50@16.00
Grand Rapids, Mich.	12.00
Hartford, Conn.	18.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Madison, Wis.	12.00
Michigan City, Ind.	12.00
Milwaukee, Wis.	13.00
New Brighton, Minn.	10.00
Pontiac, Mich.	13.00
Portage, Wis.	15.00
Rochester, N. Y. (del. on job)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	13.00@13.50
Sebewaing, Mich.	12.00
Syracuse, N. Y.	14.00@15.00
Terra Cotta, D. C.	13.50
Toronto, Canada	12.00
Wilkinson, Fla.—White	12.00
Buff	16.00

*Delivered on job. †Delivered in city limits.
‡Less 5%.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.		3.47
Atlanta, Ga.		2.35
Baltimore, Md.		2.35
Birmingham, Ala.		2.30
Boston, Mass.		2.63
Buffalo, N. Y.		2.38
Butte, Mont.	.90½	3.61
Cedar Rapids, Iowa		2.34
Charleston, S. C.		2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio		2.37
Cleveland, Ohio		2.29
Chicago, Ill.		2.10
Columbus, Ohio		2.34
Dallas, Texas	.48¾	2.15
Davenport, Iowa		2.29
Dayton, Ohio		2.38
Denver, Colo.	.66¾	2.65
Detroit, Mich.		2.05
Duluth, Minn.		2.09
Houston, Texas		2.60
Indianapolis, Ind.		2.29
Jackson, Miss.		2.60
Jacksonville, Fla.		2.50
Jersey City, N. J.		2.33
Kansas City, Mo.		2.33
Los Angeles, Calif.	.60	2.40
Louisville, Ky.		2.27
Memphis, Tenn.		2.60
Milwaukee, Wis.		2.15
Minneapolis, Minn.		2.32
Montreal, Que.		1.90
New Orleans, La.		2.40
New York, N. Y.		2.25
Norfolk, Va.		2.17
Oklahoma City, Okla.		2.56
Omaha, Neb.		2.51
Peoria, Ill.		2.27
Philadelphia, Penn.		2.41
Phoenix, Ariz.		3.70
Pittsburgh, Penn.		2.09
Portland, Colo.	.72½	2.90
Portland, Ore.		2.60
Reno, Nevada	.75¾	3.01
Richmond, Va.		2.47
Salt Lake City, Utah	.70¾	2.81
San Francisco, Calif.		2.31
Savannah, Ga.		2.50
St. Louis, Mo.	.55	2.20
St. Paul, Minn.		2.32
Seattle, Wash.	10c discount	2.65
Tampa, Fla.		2.60
Toledo, Ohio		2.20
Topeka, Kans.		2.40
Tulsa, Okla.		2.43
Wheeling, W. Va.		2.17
Winston-Salem, N. C.		2.79

NOTE—Add 40c per bbl. for bags.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.85
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.35
Davenport, Calif.		2.05
Detroit, Mich.		2.15
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Leeds, Ala.		1.95
Mildred, Kans.		2.35
Nazareth, Penn.		1.95
Northampton, Penn.		1.95
Steelton, Minn.		1.90
Toledo, Ohio		2.20
Universal, Penn.		1.85

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board— ¾x32x 36" Wt. 1500 lb. Per M Sq. Ft.	Wallboard, ¾x32x 36" Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ¾x32 or 48" Lgth 6'-10", 1850 lb. Per M Sq. Ft.
Centerville, Iowa	3.00	3.50	15.00	8.00	9.00	9.50						
Detroit, Mich.†				11.30	11.30	11.30						
Delawanna, N. J.							9.00					
Douglas, Ariz.			7.00			15.50d	18.50		30.00	15.50		
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	30.00	24.55	20.00		
Gypsum, Ohio†	3.00	4.00	6.00	8.00	9.00	9.00	18.00	30.00	24.55	20.00		
Hanover, Mont.				11.80							20.00	30.00
Los Angeles, Calif.				10.30k								
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	30.15	20.00	20.00	30.00	
Portland, Colo.				10.00								
San Francisco, Calif.			12.00	13.40r			15.40r					
Seattle, Wash.	7.00@8.00		10.00	13.00								
Sigurd, Utah								18.00a				
Winnipeg, Man.	5.00	5.00	7.00	13.00						20.00		33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).

*To 3.00; †to 11.00; ‡to 12.00; †prices per net ton, sacks extra; (a) to 21.00; (b) net; (c) gross.
(d) hair fibre; (f) delivered; (h) delivered in 6 states; (i) delivered on job; (k) sacks 12c extra, rebated.
(m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50.

New Machinery and Equipment

Haynes Stellite—A New Wear-Resisting Alloy

THE greatest destructive force in many rock products plants is steady grinding wear caused by the abrasive action of the materials entering into the manufacture of portland cement and other finished products and frequently augmented by the presence of intense heat or unusual load on equipment. This means a constant failure of

abrasion and immunity from corrosion by almost all acids and chemicals.

Haynes stellite can be deposited upon steels of all kinds, including high carbon and alloy steels. It can be fused to cast iron and copper. The process of application is by fusion welding, best accomplished by the oxy-acetylene flame and known as "Stelliting."

The practice of stelliting opens a wide use for the alloy in the cement and other



Built up pulverizer plow, and new plow (right)

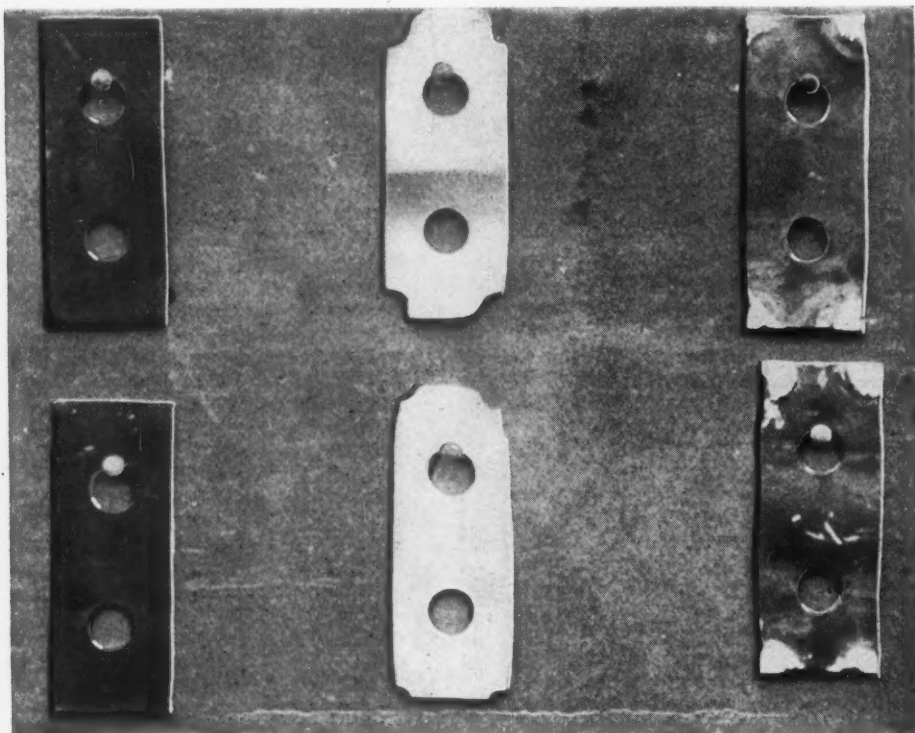


Photo showing original pulverizer hammer at right, worn hammer in center, and same hammer resurfaced and ground

machine parts and equipment, and constant replacement. Frequently it ties up production in many departments thus reducing profits.

Just how important this replacement item is can best be shown by resorting to statistics. For every million dollars invested in a cement plant proper, there must be on hand from \$75,000 to \$100,000 worth of spare parts. From 8 to 10% of the original cost of equipment must be spent each year for replacements. It is obvious, therefore, that any process that would decrease the frequency of replacement, would effect great saving.

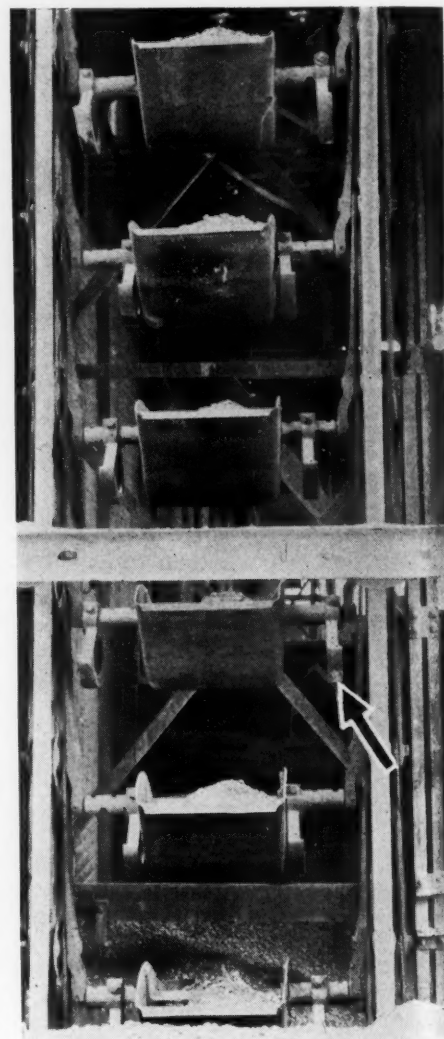
Such is the function of the metal known as "Haynes Stellite." It is an alloy consisting primarily of chromium, cobalt and tungsten, combined in such a manner that the resultant product has the properties of exceptional hardness, great resistance to

rock products industries; for the surfacing of heavy parts of machinery which would be unnecessarily hard throughout and prohibitively costly if made of solid Haynes stellite; and, for certain applications where high mechanical strength plus resistance to abrasion and heat are required.

In the cement and other rock products industries the first application for Haynes stellite would be on dipper teeth in connection with power shovels. The point of wear is generally on the edge. Stelliting of teeth, will not only increase the life considerably, but makes it possible to use less expensive steels. The same applies also to catches, lugs and cams on locomotives.

The average cement mill has an abundance of screw conveyors. This is an expensive item of equipment and must undergo constant replacement since its work is continuous and subject to severe abrasion. Stellit-

ing of screw conveyor flights will prolong life of such equipment materially. In one case the faces and peripheries of the first six flights were stellited and lasted over six times longer than the original chilled cast iron or case-hardened steel. Another application is on gudgeons connecting flights, also



Arrow shows application of Haynes stellite on pivoted bucket conveyor cams

subject to severe abrasion, where similar results were obtained.

Pivoted type of conveyor buckets are used in great quantities for reclaiming clinker and distributing to finish mills for grinding.



"Stelliting," or applying Haynes stellite to metallic surface by means of the oxy-acetylene flame

The two points of wear are on the lips of the buckets and the cams on the side.

Haynes stellite is not only durable but it is claimed to be the only metal that will withstand the destructive action of the red-hot cement clinker.

Another application of importance is on cement clinker drag chain castings. Stelliting of casting inserts will obviate the necessity of frequent replacement.

Hammers on hammer mill crushers and pulverizers have but a short life due to their high speed and terrific impact. Worn out hammers have been built up and surfaced with stellite and their life multiplied by more than six times.

Other applications for Haynes stellite are on waste-heat fan blades, plows and plow arms on pulverizers, pump impellers, blast-hole drill bits, plows on lime hydrators, etc.

In tests conducted by the Bureau of Standards and many private manufacturers, it has been found that the life of stellited parts is anywhere from three to twelve times greater than that of the best grades of steel.

The Fuller-Lehigh Co., Fullerton, Penn., manufacturers of cement making machinery and coal pulverizers have already adopted Haynes stellite in connection with certain equipment. Other companies are in the process of conducting tests, and their names will be published shortly.

The details of applying Haynes stellite by the oxy-acetylene flame and other details as to its uses may be had by writing to the manufacturers, the Haynes Stellite Co., Kokomo, Ind.

New Heavy Duty Dump Truck

THE WHITE CO., Cleveland, Ohio, has announced its new heavy duty Model 52-D, a dump truck built along the general lines of the Model 45-D, but with many refinements. The purpose of the Model 52-D is to meet changing conditions in the industry with a truck that anticipates the highly developed demands of dump-truck transportation.

The new White model has an auxiliary transmission affording the equivalent of five speeds, giving extra low-gear pulling power for hill climbing and getting out of holes or mire; a new dumping mechanism and tapered dump body; an improved and patented oil system, and the exclusive White double reduction gear drive.

Other new features claimed for the new truck include a big, sturdy, tubular type radiator, spring cradles on the frame; a wide, heavy, pressed steel bumper; heavier, easy-working steering gear; an air temperature regulator that saves fuel and adds to engine efficiency in all seasons; heavy springs; reinforced frame of chrome nickel steel, and brakes with drums of a special metal that insures quick, certain stopping and long brake life.

The auxiliary transmission, it is claimed, gives maximum flexibility of power. It enables the driver to gear down to the hardest pull when it is needed and, on the other hand, it allows the main transmission to work at a higher top speed on the level road. Power is transmitted in an actual straight line from starting crank to rear axle when operating under load. This means maximum life for all drive units.

Incorporated in the same case with the auxiliary transmission is the mechanism which operates the dumping hoist. The tapered dump body is raised on sturdy arms and links by means of a safe, speedy and positive gear drive. It lifts to an angle

greater than 50 deg., dumping any load clean. The body is under positive control in all positions and may be held at any angle. It is lowered by the same mechanism that hoists it, but can be lowered while the truck is in motion on its way back for another load. At normal rest position and at the extreme dumping angle the body is automatically stopped.

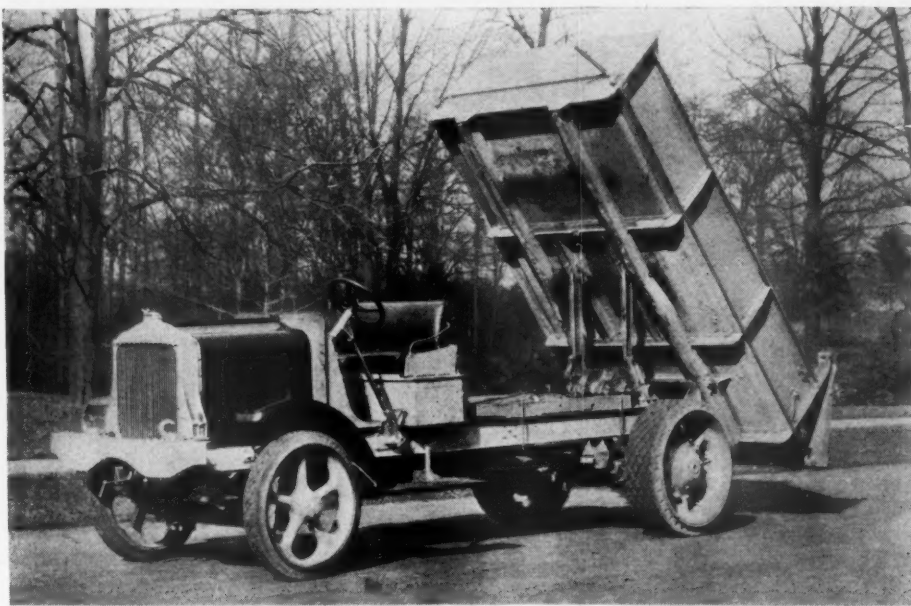
The body is mounted so that load weight is properly distributed and the dumping point is so far back that the load slides neatly over the edge of a soft fill without danger of miring the truck, or piles up clear of the truck on flat ground. A double-acting tail gate further facilitates dumping and low body sides make loading from the ground exceptionally easy. The dumping mechanism is set solidly down in the frame in a dirt-proof and weather-proof housing, the gears running in oil.

Wheelbase of the Model 52-D is 156 in. Solid tires, 36x6 front and 40x12 rear, are standard equipment.

Manganese Steel To Be Manufactured in Canada Under American Process

ARRANGEMENTS have been completed between the Taylor-Wharton Iron and Steel Co., High Bridge, N. J., and the Joliette Steel Limited, Joliette, Que., Canada, whereby the latter company will manufacture "Tisco" manganese steel, "Orbit" and other alloy steels in Canada under the Taylor-Wharton process and under Taylor-Wharton supervision. The manganese castings will be sold under the trade name of "Joliette Tisco."

Lamoreux-Kelly, Ltd., 285 Beaver Hall Hill, Montreal, have been appointed general sales agents for "Joliette Tisco," "Orbit," etc., for Canada.



New heavy duty dump truck showing high dumping angle, hoist mechanism, rigid lift arm and bumper

News of All the Industry

Incorporations

Grays Harbor Cement Products Co., Aberdeen, Wash., increased capital stock to \$26,000.

Standard Concrete Block Co., Miami, Fla., \$25,000. Philip Guise, S. B. Lansing and others.

Western Mica, Inc., Denver, Colo., \$200,000. Clyde Barker, Ralph G. Lindstrom and others.

Concrete Tile and Products Co., Ojus, Fla., \$50,000. Phil. Guise, S. P. Lansing and others.

Lutesville Sand and Gravel Co., Cape Girardeau, Mo., increased capital from \$40,000 to \$100,000.

La Beau Sand and Dredging Co., Eustis, Fla., \$10,000. C. E. La Beau, R. J. Dewey and others.

Nashville Concrete Products Co., Nashville, Tenn. J. C. Barker, 854 Argyle Avenue, Nashville.

Newburgh Sand and Gravel Co., Cleveland, Ohio, \$25,000. Antonio Lanese, Charles De More and others.

Union Gravel Co., Inc., Monroe, La., \$50,000. G. W. Eise, Monroe; G. K. Fone, Baton Rouge, and others.

Barrett Lime Quarries, Inc., Cincinnati, Ohio, \$500. Oscar F. and O. S. Barrett, Patterson Bogue and others.

Pasco Concrete Works, Pasco, Wash., dissolved. W. K. Stormont, one of the partners, will continue the business alone.

Philadelphia Marble and Slate Co., Philadelphia, Penn., \$8500. P. J. Shaughnessy, 2019 Girard Ave., Philadelphia.

California Stucco Products Co., Jefferson City, Mo., 200 shares of no par value. A. H. and G. W. Stubbs, Howard McCutcheon and R. M. Brackett.

Asphalt Rock Brick Co., Belleville, Ill., \$80,000. W. J. E. E. and A. E. Reiss. Correspondent, W. J. Reiss, 609 Forest Avenue, Belleville. To manufacture, mine and carry on quarrying.

Turnpike Cement Block Construction Co., New York, N. Y., \$50,000. C. F. Heuther, A. V. Ruff, G. Di Palma. (Attorneys, Giaccio and Titone, 191 Irving Avenue, Brooklyn, N. Y.)

Augusta Lime Co., Inc., Staunton, Va., \$10,000 to \$150,000. R. L. James, Jones Law Building, Pittsburgh, Penn.; N. C. Taylor and P. J. B. Murphy of Staunton. To quarry and prepare limestone for market.

Quarries

James Quinn, 614 E. Acacia Avenue, Glendale, Calif., is engaging in business as Haines Canyon Rock Co.

California Granite Co., Rocklin, Calif., which has been closed down for the past three years, is preparing to reopen its plant at Rocklin.

Evansville Sand and Gravel Co., Evansville, Ind., is to open a quarry at Golconda, Ky., to supply a government project with crushed stone.

Chicago, Burlington & Quincy Railroad, is opening a stone quarry on the site recently purchased for that purpose about four miles from Hot Springs, S. D.

Atlas Rock Co. has plans to open the entire length of the Stanislaus river from Oakdale to Knights Ferry. Their plant, located at Oakdale, Calif., is operating at full capacity, furnishing the rock and sand for Melones dam project.

Sand and Gravel

Superior Sand and Gravel Co., Woodworth, La., has 600 acres under development and will erect a plant to produce 20 cars of product per day. (Incorporation reported in Dec. 26 issue.)

C. M. Hughes & Co., Nashville, Tenn., are having plans drawn by E. W. Cooper of Nashville for a sand and gravel plant on the banks of the Cumberland river. Dredges, barges and tow boats will be purchased.

Carroll Bros., veteran quarrymen, have completed a spur from the West Shore Branch of the New York Central Lines at Clarence, N. Y., and will install an up-to-date sand and gravel plant, including sand washer and power shovel equipment.

American Sand and Gravel Co., Hattiesburg, Miss., are completing their plant to produce 300 cars per month of sand and gravel. W. H. K. Bennett Co., Chicago, Ill., furnished part of the equipment. (Incorporation reported in Dec. 12 issue.)

M. P. Ryley has opened a complete power shovel operated sand and gravel pit at Clarence, N. Y., to handle motor truck business. Mr. Ryley contemplates connecting with the West Shore Branch of the New York Central railroad by a short spur.

Gypsum

Atlas Gypsum Corp., Clarence Center, N. Y., has started excavations on a new plant with work in charge of Eugene Forrester of Akron, N. Y. The new plant will consist of a mine shaft, grinding and crushing mills and equipment at a total cost of about \$100,000.

Cement

Newaygo Portland Cement Co., Newaygo, Mich., closed the past year with the largest output in its history, 800,000 bbl. of cement having been produced. The company gave its employees a bonus of 8%, the same as paid to common stock holders.

North American Cement Corp., New York, N. Y., is to install two 10-ft. Hardinge conical ball mills at their plant at Howes Cave, N. Y.

Cement Products

Dearborn Concrete Block Co., Dearborn, Mich., is installing new machinery at their plant.

R. C. Teed has sold his interest in the Teed Cement Products Co., in Seattle, Wash., to H. M. Leed.

Southern Cement Products Co., Knoxville, Tenn., is to erect a plant at Sutherland Avenue, Knoxville.

Arquette Products Co., Hoquiam, Wash., will open offices in Seattle, Wash., and may establish a factory there.

Ideal Cement Stone Co. is about to begin erection of a cement block factory at 2523 Oak street, Omaha, Neb.

Kelbay Corp., 342 Madison Avenue, New York, N. Y., is planning the erection of a \$100,000 cement block plant of 25,000 blocks daily output at Fulford, Fla.

W. E. Morey Co., Chicago, Ill., are reported to have acquired a site at Tuscomb, Ala., and to plan the erection of a cement products plant.

E. E. Crooke, Indianapolis, Ind., is to establish a plant for the manufacture of concrete brick at Plant City, Fla.

California Concrete Products Co. has completed the purchase of a 10-acre site at San Carlos, Calif., and will erect a plant there for the manufacture of concrete irrigation pipe, building tile, sewer pipe, and other products. The company now operates a plant at Sunnyvale, Calif.

Feldspar

Eureka Flint & Spar Co., Trenton, N. J., is planning for the early rebuilding of the portion of its main grinding mill and plant, destroyed by fire recently, with loss reported at close to \$200,000, including equipment.

Carolina Mineral Products Corp., J. G. Mock, president, Wallace Building, Greenville, S. C., lately organized with a capital of \$250,000, has plans under way for the construction of a new one-story mill at its feldspar properties in this vicinity. The new plant will be used for crushing, grinding, sorting, and loading for commercial production, and will be equipped for a daily output of about 75 tons. It is reported to cost in excess of \$50,000, with machinery.

Miscellaneous Rock Products

Miami Korkstone Co., Miami, Fla., is reported to have acquired a site at Miami Shores and to erect a two-story 50x100 ft. factory and warehouse. Magnesia products and tile will be made.

Personal

L. J. Backus, president of the Ladd Lime and Stone Co., Cartersville, Ga., was re-elected vice-president of the Cartersville, Ga., Chamber of Commerce recently.

A. D. Stancliff has resigned his position with the Atlas Portland Cement Co. and is now with the Louisiana Portland Cement Co. in the capacity of plant superintendent.

Dr. R. B. Moore, formerly chief chemist of the U. S. Bureau of Mines, and now general manager of the Dorr Co. of New York, who was largely responsible for the development of helium production during the war, was presented with the Perkin Medal for 1925 at the Chemists' Club on January 15.

The medal is given by the American Society for Chemical Industry, and the selection is made by a committee from that organization, the American Chemical Society, the American Institute of Chemical Engineers and the American section of the Societe de Chimie Industrielle.

Trade Literature

Herringbone Speed Reducers. Pamphlet describing continuous tooth herringbone reducers and gears. Featured for use in obtaining high reduction ratios in single gear train. FOOTE BROS. GEAR & MACHINE CO., Chicago, Ill.

Gasoline Locomotives. Bulletin No. 145 on the complete line of Milwaukee gasoline locomotives built in sizes from 4½ to 18 tons. Features type "H" built in standard design, adapted for all classes of haulage and for different track gauges. Specifications, details on designs, illustrations, etc. MILWAUKEE LOCOMOTIVE MFG. CO., Milwaukee, Wis.

Orange Peel and Clam Shell Buckets. Bulletin No. 656 on three-sided and rope reeved orange peel buckets for handling boulders, blasted rock and hard, odd-shaped material. Especially designed for unusual digging and rehandling needs. Details of construction, illustrations, etc.

Bulletin No. 652 describing and illustrating class "G" and "H" clam shell buckets for digging gravel, sand, phosphates, etc. Construction details and uses, etc. THE HAYWARD CO., New York, N. Y.

Manufacturers

W. A. Jones Foundry and Machine Co., Chicago, Ill., held their annual sales conference recently. Representatives of the company were present from all over the country and from their opinions 1926 will be the banner year in the company's history.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., have recently issued a handsomely illustrated bulletin entitled "Engineering Achievements for 1925." It describes the outstanding electrical engineering construction of the company for the past year and discusses briefly the most salient features bearing on the different industries they were designed for.

Fate-Root-Heath Co., Plymouth, Ohio, manufacturers of Plymouth gasoline locomotives, has appointed Roy M. Nelson to represent them in the quarry, sand and gravel and industrial fields of the Chicago territory. Mr. Nelson will be associated with R. N. Lowry, who will continue as Chicago representative but will devote his entire attention to the construction and contracting fields. Office will be maintained at the Peoples Life Building, Chicago.

Timken Roller Bearing Co., Canton, Ohio, announces the appointment of Ernest Wooler as chief engineer. For the past year Mr. Wooler held the position of automotive engineer. His present position puts him in full charge of all automotive, industrial, experimental and service engineering. Mr. Wooler is a graduate of the Manchester Technical School, Manchester, England, and has had a wide experience in engineering and manufacturing both abroad and in the United States. Other changes in the executive personnel of the company include the promotion of J. W. Spray to the position of manager of sales, automotive division; E. W. Austin and R. W. Ballentine to the positions of assistant sales managers of the automotive division and Peter C. Ross to assistant advertising manager.

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Power and Engineering Show a Great Success

THE Fourth National Exposition of Power and Mechanical Engineering attained the ideals of its originators for its diversified and well balanced display of valuable exhibits of power and mechanical engineering apparatus. In the number and diversity of exhibits, in attendance and in enthusiasm of both spectators and exhibitors this exposition was far ahead of its predecessors.

The show was well attended, almost 100,000 visitors from all parts of the United States and 23 foreign countries having seen the exhibit. Among these were many engineers who were in New York to attend the annual meetings of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers and others, as well as many prominent executives in the industrial and power fields.

Three floors of the Grand Central Palace were entirely filled with the exhibits of over four hundred manufacturers representing leaders in the entire mechanical field. There were splendid showings of heating and ventilating apparatus, refrigerating machinery, machine tools and power transmission apparatus, as well as a complete representation of all types of apparatus in the

power field.

Viewing the Exposition as a whole, the outstanding characteristic was the large number of working models and full size showings of apparatus. These included stack breechings, economizers, super-heaters, stokers, coal pulverizers, air compressors, large motor operated valves, and several showings of combustion control apparatus in operation. Working models included a coal pulverizing plant, several boilers with one side cut away and covered with glass, coal pulverizing and conveying equipment and coal handling devices.

Among the novelties displayed were four new types of unit pulverizers for powdered coal, several types of mechanically and electrically operated combustion-controlled systems and a four-cylinder crankless Diesel engine where the four cylinders parallel to the shaft worked on a swash plate keyed to the shaft.

Developments in gages, meters, and recording instruments were mainly in the direction of securing easier readings instruments and in eliminating errors of reading and calibration. These instruments included all types of devices for measuring and recording the flow of air, steam and water and

temperatures and CO₂ content.

The strides that are being made in solving refractory problems were revealed in a series of highly interesting exhibits. Hollow furnace side walls for air cooling, the use of carborundum blocks, new cements, and simple methods for their application were among the interesting showings.

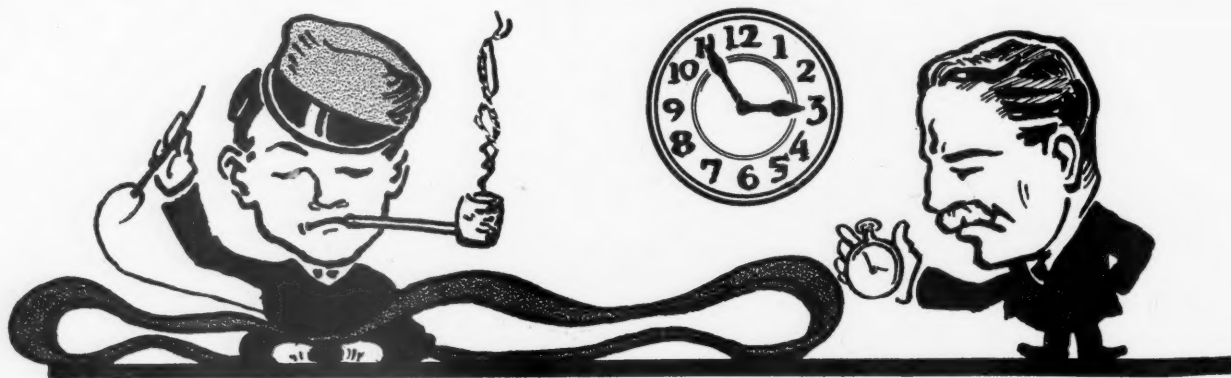
In the accessory field there were many new developments. These included electrically-operated soot blowers, non-collapsible float steam traps, safety stops for steam engines, air-cooled soot blowers, water columns, feedwater filters, regulators, pump governors, etc.

There were several large size commercial steam turbine units on exhibition. There were also several very interesting showings of small steam turbines for direct connecting or gearing to electric generators with ratings as low as 5 k.w.

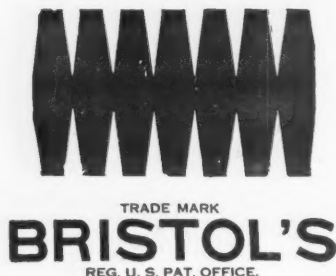
The exhibits of electric equipment included many types of direct and alternating current motors, a mercury arc battery changing set and several lines of switchboard and portable instruments, couplings and underground conduit systems.

Heating and ventilating equipment formed one of the interesting features of the Exposition, much new equipment for every phase being shown.

During the show there was a series of lectures and moving pictures dealing with the important developments in the power field.



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